PBW

Consulting Engineers and Scientists

PASTOR, BEHLING & WHEELER, LLC
2000 S. Mays, Suite 300
Round Rock, TX 78664

Tel (512) 671-3434
Fax (512) 671-3446

January 27, 2005
(PBW Project No. 1259)

Ms. Barbara A. Nann, Assistant Regional Counsel
U.S. Environmental Protection Agency, Region 6
Office of Regional Counsel (6RC-S)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Re: Preliminary Proposed Revisions to the Draft Statement of Work for the Remedial Investigation and Feasibility Study at the Gulfco Marine Maintenance Superfund Site in Freeport, Texas (the "Site")

Dear Ms. Nann:

On behalf of Sequa Corporation ("Sequa") and The Dow Chemical Company ("Dow"), Pastor, Behling & Wheeler, LLC ("PBW") is transmitting herewith our preliminary proposed revisions to the draft Statement of Work (SOW) for the Remedial Investigation and Feasibility Study (RI/FS) for the Subject Site. These proposed revisions are provided to facilitate an in-depth discussion of the SOW. Accordingly, a brief explanation of the rationale for key revisions is provided by paragraph below:

¶3: The revisions in this paragraph are proposed to recognize that guidance, by its very nature, is general and as such thus some guidance documents and/or sections of other guidance documents may not be applicable to the Site. Such recognition is already acknowledged in this paragraph, but the proposed revisions clarify that both entire documents and sections of documents may not be applicable to the Site.

¶4: The RI/FS Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA provides **suggested** formats for the RI and FS reports (Tables 3-13 and 6-5, respectively). This document also provides descriptions of elements of the RI and FS reports, but, as guidance, it does not specify a required format or content for either document. This revision is proposed for consistency between the SOW and the guidance document and to recognize that the suggested format in a guidance document should not be a SOW requirement..

¶10: The revisions in this paragraph are proposed for consistency with the Administrative Order on Consent (AOC) (Paragraph 17 therein refers to "natural clay liners"in the impoundments) and/or correspondence between Fish Engineering & Construction, Inc. and the Texas Department of Water Resources at the time of impoundment closure.

¶12: These revisions are proposed to more specifically describe the nature and locations of hazardous substances in soils at the Site. These revisions are consistent with comments provided on the AOC.

¶14: These revisions are proposed to more specifically describe the nature and locations of hazardous substances in ground water at the Site. These revisions are consistent with comments provided on the AOC. The discussions of the City of Freeport wells is deleted from this paragraph since these wells are all over 3.5 miles away from the Site, are completed in significantly deeper zone than the affected shallow groundwater at the Site and thus are not germane to Site groundwater issues.

¶16: Consistent with comments on Paragraph 3, these revisions are proposed to emphasize that not all guidance may be applicable to the Site. We specifically object to the establishment of the RI/FS guidance and the other 32 guidance documents listed in Appendix B-2 as Performance Standards. Such a requirement in the SOW is overly broad and seems to equate these guidance documents with the weight of NCP regulations. Not only may sections of documents or entire documents listed in Appendix B-2 not be applicable to the Site, but several of the documents listed have effectively been replaced or supplemented by more recent guidance that is not cited in the appendix. For example, Reference 11 in Appendix B-2 ("Guidance for Quality Assurance Project Plans (QA/R-5)", EPA/600/R-98/018, February 1998) has been replaced by "Guidance for Quality Assurance Project Plans (QA/R-5)", EPA/240/R-02/009, December 2002. Similarly, many of the topics in Reference 31 ("Community Relations in Superfund: A Handbook", January 1992, OSWER Directive No. 9230.0-3C) appear to have been updated in "Superfund Community Involvement Handbook", EPA/540/K-01/003, April 2002. The draft SOW's intent to establish these documents as performance standards seems to run counter to the objectives of many of these guidance documents, which as noted in the Foreword of EPA/240/R-02/009 is to "...not impose legally binding requirements on EPA or the public and may not apply to a particular situation, based on the circumstances."

¶21 and 22: These revisions are proposed to again recognize that not all of the Appendix B-2 guidance documents are applicable to Site conditions and that more recent guidance on the same or similar topics may better reflect information to be included in deliverables prepared in accordance with this SOW. We believe a more flexible approach to the role of these potential guidance documents is in the best interests of both EPA and the Respondents.

¶23.a: Additional time is requested from the effective date of the AOC to the RI/FS scoping phase meeting to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.

¶23.b: More flexible language is requested regarding existing information sources in Table 2-1 to recognize that not all of the sources listed in this table will be useful for this site. For example, the US Forest Service, or Local Sewage Treatment Plants (both listed in Table 2-1) would not be expected to provide useful information for this effort.

¶24: Additional time is requested for submittal of the Draft RI/FS Work Plan to again allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.

¶25: Additional time is requested for submittal of the Final RI/FS Work Plan to allow discussion of EPA's review comments with the goal of resolving comments in a single submittal rather than several rounds of revision.

¶28: This revision is proposed to recognize that treatability testing may not be required and make Paragraph 28 consistent with the discussion of Task 8 (Treatability Studies) in Paragraph 45.

¶30: Similar, to the comment on Paragraph 4 above, this revision is proposed to recognize that the RI/FS guidance describes elements of the RI/ FS WP and provides a **suggested** format (Table 2-3), but, as guidance, does not specify a required format or content for the document.

¶32: Additional time is requested for submittal of the Draft RI/FS Sampling and Analysis Plan (SAP) so this document is submitted concurrent with its companion document, the RI/FS WP.

¶33: Additional time is requested for submittal of the Final RI/FS SAP to allow discussion of EPA's review comments with the goal of resolving comments in a single submittal rather than several rounds of revision.

¶34.a: The revisions in this paragraph are proposed to remove the requirement that the RI/FS SAP include information that will already be submitted as part of the RI/FS WP (thus minimizing the redundancy between these documents). It is also proposed that, consistent with EPA guidance, the data quality objective process be used to develop the sampling program to be included in the RI/FS SAP, rather than specifying a pre-ordained sampling program consisting of both biased and random samples in the SOW, prior to development of the conceptual site model or data quality objectives. Similar, to the comment on Paragraph 4 above, the revisions regarding the RI/FS SAP format and content is proposed to recognize that the RI/FS guidance describes elements of the RI/ FS SAP and provides a **suggested** format (Table 2-4), but, as guidance, does not specify a required format or content for the document.

¶34.b: The revision in this paragraph is proposed to recognize that the guidance cited does not specify a required format or content for the RI/FS QAPP on this project. The first document cited in this paragraph (EPA, 1998b) has been replaced by "Guidance for Quality Assurance Project Plans (QA/R-5)", EPA/240/R-02/009, December 2002 (EPA, 2002). This more recent document (EPA, 2002) provides a table of QAPP elements (Table 1) and **suggested** content and formatting information throughout the document, but notes in the Foreword: "This document does not impose legally binding requirements on EPA or the public...." and "....EPA and other parties should consider whether the recommendations in the document are appropriate for the particular situation." The second document cited in this paragraph (EPA, 2001) does specify detailed QAPP requirements; however, as noted in the Foreword, "This document provides the QA Project Plan requirements for **organizations that conduct environmental data operations on behalf of EPA through contracts, financial assistance agreements, and interagency agreements...**" The Foreword goes on to note that document may be used by EPA, but refers to EPA, 1998b as a companion document for non-EPA organizations. We believe the proposed changes to Paragraph 34.b reflect the appropriate role of these guidance documents on this project.

¶36: Additional time is requested for submittal of the RI/FS Health and Safety Plan (HSP), so this document is submitted concurrent with the RI/FS WP and RI/FS SAP. The analysis of physical and chemical hazards to be presented in the HSP is contingent on the specific sampling activities to be performed. Since these activities are identified in the RI/FS WP and SAP, it would be difficult to properly complete the HSP ahead of these documents.

¶37: The revision in this paragraph is proposed to recognize that the guidance cited, does not specify a required format or content for the RI/FS Site HSP. Appendix B of the RI/FS Guidance (EPA, 1988b) list the elements of a HSP, but, as guidance, it does not establish a required format or content for the HSP.

¶ 41: This revision proposes deletion of the Preliminary Site Characterization Report (PSCR) as a deliverable on this project. Submittal of a PSCR is not specifically required by the NCP, and, as described in Section 3.7.2 of the RI/FS Guidance, all information included in this report is repeated in the subsequent RI Report. Given the frequency of EPA/Respondent communication on this project (through monthly status reports, project meetings and informal telephone discussions), the possible use of dynamic field plans and on-site decision making as previously suggested by EPA personnel, and what we believe will a rather straightforward and streamlined RI, we feel that preparation of a PSCR is not needed or appropriate for this project.

¶42: The first revision to this paragraph is proposed to make the paragraph consistent with our revised comments on the AOC. The second revision is proposed to recognize that not all of the field activities listed in this paragraph may be required for this RI/FS.

¶43.a: The various subsections of this paragraph detail very specific activities to be performed as part of RI field investigations. It is currently unclear that all of the required activities listed in this paragraph will be necessary to fill data gaps identified during the RI/FS scoping process; hence, we have added the proposed revisions to permit the flexibility for appropriately determining the scope of field investigation activities through the scoping process and describing these activities in the RI/FS WP and SAP, rather than prematurely specifying these activities in the SOW. The revision in 43.a.(iii) referencing the surface removal action is proposed to recognize that the characterization of wastes as part of the RI/FS is not appropriate until removal of those wastes to be addressed during the removal action has been completed.

¶43.b: Although we do not currently anticipate performing modeling as part of the RI/FS the first revision in this paragraph is proposed to allow sufficient time to properly respond to and address EPA comments on what could be a complex and highly technical document. The other revisions in this paragraph are proposed for clarification and consistency with the rest of the SOW.

¶43.d: It is proposed that this paragraph be deleted from the SOW, since as described above, we believe that preparation of a PSCR is not needed or appropriate for this project.

¶44.a.(i): This revision reflects the proposed deletion of the PSCR and clarifies that contaminants of concern will be selected during performance of site characterization activities.

¶44.a.(ii) through (viii): The changes to these paragraphs propose the deletion of the Potential Chemicals of Concern (PCOC) Memorandum and the Draft Exposure Assessment (DEA) Memorandum as a deliverables on this project. Submittals of PCOC and DEA memoranda are not specifically required by the NCP, and are not specifically mentioned in RI/FS Guidance (EPA, 1988a). The information to be included in these memoranda will be described in detail as part of the risk assessment portion of the RI/FS WP and will be provided in the Baseline Human Health Risk Assessment (BHHRA) Report. Because this process and information will be described in the RI/FS WP and then used in the BHHRA, we feel that preparation of these memoranda is not needed or appropriate for this project. Requiring preparation of these memoranda as interim steps in the BHHRA process seems inconsistent with the overall goal of streamlining the RI/FS. In our experience, preparation of interim BHHRA deliverables has not been required on CERCLA projects of considerably greater scope and complexity than the Gulfco site. Similarly, preparation of a Toxicological and Epidemiological Studies Memorandum for chemicals lacking an EPA toxicity value seems to be a overly formal and unnecessary method of addressing what we believe to be a fairly simple issue. We believe our proposed revision whereby EPA and Respondents work together to identify an appropriate surrogate toxicity factor or other means to evaluate risk present a more streamlined and cost-effective approach for addressing this potential issue.

¶44.b: The changes to this paragraph reflects the proposed deletion of the interim BHHRA deliverables as discussed above. Although the number of days requested in this paragraph for submittal of the Draft BHHRA Report is expanded from the previous draft of the SOW, the actual submittal time for the BHHRA is shortened due to the elimination of interim deliverables. Also, with the proposed elimination of the PSCR as a project deliverable, the time line for submittal of the BHHRA is tied to EPA approval of the Final RI Report.

¶44.c: Additional time is requested for submittal of the Final BHHRA Report to allow discussion of EPA's review comments with the goal of resolving comments in a single submittal rather than several rounds of revision.

¶44.d: This paragraph describes the ecological risk assessment process in substantially greater detail than other parts of the RI/FS and BHHRA are described in their respective sections of the SOW. In our opinion this level of detail is unwarranted and potentially confusing. Our proposed revisions are intended to streamline this discussion while maintaining the substantive requirements. As proposed, a Draft Screening Level Ecological Risk Assessment (SLERA) Report will be submitted within 90 calendar days of EPA approval of the final RI Report and the Final SLERA Report will be submitted within 30 days of receipt of EPA comments on the draft. With EPA concurrence, the SLERA will determine that either: (1) potential ecological threats are negligible; or (2) potential ecological threats are significant. In the event that the SLERA determines that potential ecological threats are significant, the Respondents may collect additional data and perform a Baseline Ecological Risk Assessment (BERA) to better quantify ecological risks. Alternatively, the Respondents may accept the SLERA conclusions that the Site poses an unacceptable ecological risk and develop remedial action objectives based on the SLERA. If Steps 3 through 7 of the BERA are performed, appropriate documents such as a Ecological Problem Formulation Report, will be developed and submitted with EPA input and concurrence. We believe that if this level of sophistication is required for the ecological risk evaluation of the Site, we will be working extremely closely with EPA to develop site-specific documents and would request flexibility in the document preparation and deliverable submittal schedule. If a site-specific BERA is performed, the Draft BERA Report will be submitted within 90 calendar days following validation of the supporting data collected for the BERA. The Final BERA Report will be submitted within 30 days of receipt of EPA comments on the draft.

¶45: The first revision to this paragraph (in Section a.(ii)) is proposed to recognize that a literature survey may not be necessary in order to determine the need for treatability testing. For example, if the preliminarily identified response action alternatives and associated candidate technologies were all conventional, well-established technologies, it is doubtful that such a survey would be needed. Subsequent revisions to this paragraph all pertain to expanding the time frames for submittal of the Draft and Final Treatability Study Work Plans and the Final Treatability Study Report, to the extent that these documents are necessary. This expanded time frames are requested to allow in-depth discussion with EPA regarding candidate treatability

studies prior to Draft WP submittal and to allow discussion of EPA's review comments on the Draft WP and Report with the goal of resolving comments in a single submittal rather than several rounds of revision.

¶46: The revisions to this paragraph reflect the earlier proposed deletion of the PSCR and thus tie the schedule for the Draft RI submittal to receipt of all validated sample analytical results from the laboratory. Although 90 days is proposed for this submittal, this schedule still represents a shorter overall time period from the receipt of validated data to report submittal than the time period that would be required if the interim PSCR report were submitted.

¶47: Additional time is requested for submittal of the Final RI Report to allow discussion of EPA's review comments with the goal of resolving comments in a single submittal rather than several rounds of revision.

¶48: The RI/FS Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA provides a **suggested** format for the RI Report (Tables 3-13). This document also provides descriptions of elements of the RI Report, but, as guidance, it does not specify a required report format or content.

¶51 through 55: These paragraphs propose deletion of the Remedial Alternatives (RA) Memorandum as an interim deliverable to the Draft Feasibility Study (FS) Report and deletion of the Interim-Final FS Report prior to the Final FS Report submittal. Neither the RA Memorandum nor the Interim-Final FS Report are specifically required by the NCP. The RA Memorandum represents one of several approaches for communication during the alternative development and screening process as described in RI/FS Guidance (EPA, 1988a) and the information to be included in the RA Memorandum will be provided in its entirely in the Draft FS Report. Given the frequency of EPA/Respondent communication on this project (through monthly status reports, project meetings and informal telephone discussions), we feel that preparation of this memorandum is not needed or appropriate for this project. The RI/FS guidance (EPA, 1988a) even acknowledges that,"(f)or the purposes of speed and efficiency, the preferred approach for exchange of information is through meetings." Similarly, submittal of an Interim-Final FS Report seems unnecessary and inconsistent with a streamlined approach toward completion of the RI/FS.

Appendix B-1: The revisions proposed in this appendix reflect the revised deliverable submittals and meeting scheduled proposed in earlier paragraphs of the SOW. Although technically not part of the RI/FS, an initial meeting, associated with the development of a Consent Order and Statement of Work for a removal action, has been added to this schedule to show the Respondents' goal of promptly initiating the removal action process following the effective date of the AOC.

Appendix B-2: The revisions to this appendix are proposed to recognize that not all of documents listed herein may be applicable to the Site.

Thank you for the opportunity to submit these proposed revisions. We look forward to discussing them with you at your earliest convenience.

Sincerely,

PASTOR, BEHLING & WHEELER, LLC

Eric F. Pastor, P.E.
Principal Engineer

cc: Mr. Brent Murray - Sequa Corporation
Mr. Scott Magelssen - The Dow Chemical Company
Ms. Sandi Van Wormer - The Dow Chemical Company
Mr. Allen Daniels - LDL Coastal Limited, LP
Mr. F. William Mahley - Strasburger & Price, LLP
Mr. James C. Morris III - Thompson & Knight, LLP
Ms. Elizabeth Webb - Thompson & Knight, LLP

APPENDIX B

DRAFT STATEMENT OF WORK
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

GULFCO MARINE MAINTENANCE SUPERFUND SITE
FREEPORT, BRAZORIA COUNTY, TEXAS

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APPENDIX B

DRAFT STATEMENT OF WORK (SOW)
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

GULFCO MARINE MAINTENANCE SUPERFUND SITE
FREEPORT, BRAZORIA COUNTY, TEXAS

I. INTRODUCTION

1. This Statement of Work (SOW) provides an overview of work that will be carried out by Respondents as they implement a Remedial Investigation and Feasibility Study (RI/FS) for the Gulfco Marine Maintenance Superfund Site (Site). This RI/FS SOW is attached to the Administrative Order on Consent (AOC) for the Site and is a supporting document for the AOC. Technical work described in the SOW is intended to provide more information to Respondents for purposes of implementing the AOC and is not intended to change the meaning of any AOC language. This SOW is also consistent with both the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the National Contingency Plan (NCP). Any discrepancies between the AOC and SOW are unintended, and whenever necessary, the AOC will control in any interpretive disputes.

2. The purpose of the RI/FS is to investigate the nature and extent of contamination for the Site, to assess the potential risk to human health and the environment, and to develop and evaluate potential remedial alternatives. The RI and FS are interactive and will be conducted concurrently, to the extent practicable, in a manner that allows information and data collected during the RI to influence the development of remedial alternatives during the FS, which in turn affect additional information and data needs and the scope of any necessary treatability studies and risk assessments.

3. Respondents will conduct the RI/FS and will produce draft RI and FS reports that are in accordance with the AOC. The RI/FS will be consistent with applicable guidance from the Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (U.S. EPA, Office of Emergency and Remedial Response, October 1988), Guidance for the Data Quality Objectives Process (EPA QA/G-4, August 2000), Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments (U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997), and other guidance that EPA uses in conducting an RI/FS (a list of potential guidance is attached). EPA is aware that not all guidance (including entire documents or sections of documents) used for the RI/FS purposes may be applicable to the Site. EPA Project Managers for sites have the authority under the NCP to determine

when application of any guidance would be inappropriate. Respondents may raise such guidance issues they consider appropriate during the implementation of the AOC. EPA's decisions regarding guidance applicability will be incorporated into document approval correspondence or in other written correspondence as appropriate.

4. The RI/FS Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA describes the suggested report format and content for the draft RI and FS reports. Respondents will furnish all necessary personnel, materials, and services needed for, or incidental to, performing the RI/FS, except as otherwise specified in the AOC.

5. At the completion of the RI/FS, EPA will be responsible for the selection of a site remedy and will document this selection in one or more Records of Decision (ROD). The remedial action alternatives selected by EPA will meet the cleanup standards specified in Section 121 of CERCLA, 42 U.S.C. § 9621; the selected remedy will be protective of human health and the environment, will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements (ARARs), will be cost-effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable, and will address the statutory preference for treatment as a principal element, as appropriate under the NCP. The final RI/FS report, as approved by EPA, will, with the administrative record, form the basis for the selection of the Site's remedy and will provide the information necessary to support development of one or more RODs.

6. As specified in Section 104(a)(1) of CERCLA, 42 U.S.C. § 9604(a)(1), EPA will provide oversight of Respondents' activities throughout implementation of the AOC. Respondents will support EPA's initiation and conduct of activities related to implementation of oversight activities.

Purpose of the Statement of Work

7. This SOW sets forth certain requirements of the AOC for implementation of the Work pertaining to a RI/FS for the Site. The Respondents shall undertake the RI/FS according to the AOC, including, but not limited to, this SOW.

Objectives of the Remedial Investigation/Feasibility Study

8. The objectives of the RI/FS are to investigate the nature and extent of contamination at the Site and to develop and evaluate potential remedial alternatives, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, 42 U.S.C. § 9601, et seq.), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan).

Specifically, these objectives are to determine the presence or absence, types, and quantities (concentrations) of contaminants; mechanism of contaminant release to pathway(s); direction of pathway(s) transport; boundaries of source(s) and pathway(s); and environmental/public health receptors.

Scope of the Remedial Investigation and Feasibility Study

9. The general scope of the RI/FS shall be to address all contamination at the Site resulting from the hazardous substances present at the Site.

Description of the Site

10. The Gulfco Site was a former barge cleaning and servicing facility located in Freeport, Texas. It operated from 1971 through 1998. Barges brought to the facility were cleaned of waste oils, caustics, and organic chemicals, and the wash waters generated during these operations were stored in three surface impoundments, or earthen pits, with natural clay liners located on Lot 56 on the north side of Marlin Avenue. The three surface impoundments covered a total area of about 2.3 acres. With state approval, these impoundments were closed by partial removal of sludges, filling with clay, and covering with gravel or crushed shells in August 1982. Approximately 100 cubic yards of sludge was left in the surface impoundments following closure, primarily in surface impoundment No. 2. After 1981, waste wash waters were stored in a rented floating barge or aboveground storage tanks located at the Site. The dry dock area associated with Barge Slip 1 permitted a barge to be completely removed from the water for necessary repairs on its bottom or to sandblast and repaint the entire hull. The barge slips and dry dock area where barges are emptied and repaired incorporated no containment or levees to contain potential contaminant migration.

11. The Gulfco Site is located at 906 Marlin Avenue, Freeport, Brazoria County, Texas. The property consists of lots 21 through 25 and lots 55 through 58, Subdivision 8, of the Brazos Coast Investment Company. Marlin Avenue separates lots 55 through 58 on the north from lots 21 through 25 on the south. Lots 21 through 25 are approximately four acre tracts bordered on the south by the Intracoastal Waterway. Lots 55 through 58 are approximately five acre tracts. The entire property is about 40 acres in size.

12. Soil sampling activities performed at the Site by the Texas Natural Resource Conservation Commission (TNRCC)(now known as the Texas Commission on Environmental Quality) in January 2000 detected one or more hazardous substances above background concentrations or above the sample quantitation limit (for substances not detected in site-specific background samples) in soil samples collected near two former sandblast areas, near a former drum storage area, near a former wash water storage area, southeast of the former impoundments, and near a driveway area on Lot 57.

In many cases, these reported detections were qualified as estimated concentrations because one or more quality control criteria had not been met.

13. The Site is located on the north bank of the Intracoastal Waterway between Oyster Creek on the east and the Old Brazos River Channel and the Dow Barge Canal on the west. The southern part of the Site, south of Marlin Avenue, drains toward the south where it enters into the Intracoastal Waterway. Areas north of Marlin Avenue are relatively level. Drainage from these areas is to the northeast into adjacent wetlands, then to Oyster Creek. The wetlands are directly adjacent to the surface impoundments on the north, east, and west, and are classified as intertidal, emergent, estuarine, persistent, and irregularly flooded. These wetlands extend approximately 0.48 miles to Oyster Creek. The Site is located within an area of 100-year coastal flood with velocity or wave action.

14. Ground water sampling activities performed at the Site by the TNRCC in January 2001 detected several hazardous substances above background concentrations or above the sample quantitation limit (for substances not detected in site-specific background samples) in ground water samples collected from temporary monitoring wells in the immediate vicinity of the former impoundments. A number of these detected concentrations were qualified as estimated because one or more quality control criteria had not been met. Ground water at the Site flows to the southeast. The closest water supply well (Well BH8106-303) is on the west adjacent property to the Site, and was used for a public marina until 1984. The well is 199 feet deep and is screened from a depth of 188 feet to 198 feet.

15. The Site was proposed for listing on the National Priorities List ("NPL") on September 5, 2002 (67 FR 56794), and was placed on the NPL effective May 30, 2003, in a final rulemaking published on April 30, 2003 (68 FR 23077).

II. PERFORMANCE STANDARDS

16. The Performance Standards for this RI/FS shall include substantive requirements, criteria, or limitations which are specified in the AOC, including, but not limited to, this SOW. Submissions approved by the EPA are an enforceable part of the AOC; consequently, cleanup goals and other substantive requirements, criteria, or limitations which are specified in EPA-approved submissions are Performance Standards. The EPA will use the Performance Standards to determine if the work, including, but not limited to, the RI/FS, has been completed. The Respondents shall ensure that the RI/FS is consistent with applicable sections of the EPA's "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b, hereinafter "the RI/FS Guidance") and other applicable EPA guidance cited herein. If the EPA approves a schedule for any work pursuant to the AOC, the schedule shall supersede

any timing requirements established in the RI/FS guidance or other guidance. Likewise, if the EPA, pursuant to the AOC, requires the Respondents to perform certain work at a point in time which is not consistent with the RI/FS guidance or other guidance, the Respondents shall perform the work as specified by the AOC. For example, on page B-2, the RI/FS guidance says that the Field Investigation is complete when the contractors or subcontractors are demobilized from the field; however, if the EPA, pursuant to the AOC, requires the Respondents to perform additional field investigation activities once the contractors or subcontractors have demobilized, the Respondents shall remobilize the contractors or subcontractors and perform the additional work

III. ROLE OF THE EPA

17. The EPA's approval of deliverables, including, but not limited to, submissions, is administrative in nature and allows the Respondents to proceed to the next steps in implementing the work of the RI/FS. The EPA's approval does not imply any warranty of performance, that the RI/FS, when completed, will meet Performance Standards, or that the RI/FS will function properly and be ultimately accepted by the EPA. The EPA retains the right to disapprove submissions during the RI/FS. The EPA may disapprove deliverables including, but not limited to, submissions concerning such matters as the contractor selection, plans and specifications, work plans, processes, sampling, analysis and any other deliverables within the context of the AOC. If a submission is unacceptable to the EPA, the EPA may require the Respondents to make modifications in the submission, and the EPA may require the Respondents to do additional work to support those modifications. That is, if a submission reports certain work that is unacceptable to the EPA, the EPA may require the Respondents to modify the submission text and to perform the work until it is acceptable to the EPA. The Respondents shall modify the submission and perform the work as required by the EPA.

IV. RESPONDENTS' KEY PERSONNEL

Respondents' Project Coordinator

18. When necessary, as determined by the EPA, the EPA will meet with the Respondents and discuss the performance and capabilities of the Respondents' Project Coordinator. When the Project Coordinator's performance is not satisfactory, as determined by the EPA, the Respondents shall take action, as requested by the EPA, to correct the deficiency. If, at any time, the EPA determines that the Project Coordinator is unacceptable for any reason, the Respondents, at the EPA's request, shall bar the Project Coordinator from any work under the AOC and give notice of the Respondents' selected new Project Coordinator to the EPA.

V. TASKS TO BE PERFORMED AND DELIVERABLES

Conduct of the Remedial Investigation/Feasibility Study

19. This SOW specifies the Work to be performed and the deliverables which shall be produced by the Respondent. The Respondent shall conduct the RI/FS in accordance with this SOW, AOC, and all applicable guidance that the EPA uses in conducting RI/FS projects under CERCLA, as well as any additional requirements in the AOC. The Respondents shall furnish all personnel, materials, and services necessary for, and incidental to, performance of the RI/FS, except as otherwise specified in the AOC or SOW.

Submittal of Deliverables

20. All draft and final deliverables specified in this SOW shall be provided in hard copy, by the Respondents, to the EPA (three copies), EPA's RI/FS Oversight Contractor (one copy), Texas Commission on Environmental Quality (TCEQ, one copy), and the Natural Resource Trustees[1] (one copy each). Draft and Final deliverables shall be provided in electronic format (specifically, WordPerfect® Version 9.0 [or higher] for Windows™ and Adobe® PDF format [only final deliverables]) to the EPA. Final deliverables shall be provided in hard copy and electronic format (specifically, Adobe® PDF format) to the Information Repository(ies) established for the Site. Additionally, all deliverables specified in this SOW shall be submitted by the Respondent according to the requirements of this SOW and Appendix B-1 (Schedule of Deliverables/Meetings).

21. All deliverables shall be developed in accordance with applicable sections of the potential guidance documents listed in Appendix B-2[2] (Potential Guidance Documents) to this SOW. If the EPA disapproves of or requires revisions to any of these deliverables, in whole or in part, the Respondents shall submit to the EPA revised plans which are responsive to such directions or comments.

Tasks to be Performed by the Respondents

22. The Respondents shall perform each of the following Tasks (Tasks 1-10) as specified in this SOW. These Tasks shall be developed in accordance with applicable sections of the potential guidance documents listed in Appendix B-2 (Potential Guidance Documents) to this SOW and any additional guidance applicable to the RI/FS process.

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[1]The Natural Resource Trustees for the Site have been preliminarily identified as the U.S. Department of the Interior, U.S. Fish and Wildlife Service, United States Geological Survey, Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, and Texas General Land Office.

[2]Appendix B-2 of this SOW does not include all guidance documents that are applicable to the RI/FS for the Site. The Respondent should consult with EPA's Remedial Project Manager for additional guidance and to ensure that these guidance documents have not been superseded.

Task 1: Project Planning

23. The purpose of Task 1 (Project Planning) is to determine how the RI/FS will be managed and controlled. The following activities shall be performed by the Respondents as part of Task 1:

a. Attend Scoping Phase Meeting - The Respondents shall contact the EPA's Remedial Project Manager after the Effective Date of the AOC to schedule a scoping phase meeting. The ***Scoping Phase Meeting*** shall occur within **one hundred ninety-five (195) calendar days** after the Effective Date of the AOC. [COMMENT: The expanded time frame from the effective date of the AOC to the scoping phase meeting is requested to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.] The scoping phase meeting may include, but not be limited to, a discussion of the following:

(i) The proposed scope of the project and the specific investigative and analytical activities that will be required;
(ii) Whether there is a need to conduct limited sampling to adequately scope the project and develop project plans;
(iii) Preliminary remedial action objectives;
(iv) Potential remedial technologies and the need for or usefulness of treatability studies;
(v) Potential ARARs associated with the location and contaminants of the Site and the potential response actions being contemplated; and
(vi) Whether a temporary Site office should be set up to support Site work.

b. Evaluate Existing Information - The Respondents shall compile and review all existing Site data. The Respondents shall refer to Table 2-1 (Data Collection Information Sources) of the RI/FS Guidance for a list of possible data collection information sources, and the Respondents shall exhaust all of those applicable sources in compiling the data.

(i) The Respondents shall compile all existing information describing hazardous substance sources, migration pathways, and potential human and environmental receptors. The Respondents shall compile all existing data relating to the varieties and quantities of hazardous substances released on and near the Site. The Respondents shall compile and review all available data relating to past disposal practices of any kind on and

near the Site. The Respondents shall compile existing data concerning the physical and chemical characteristics of the hazardous substances, and their distribution among the environmental media (ground water, soil, surface water, sediments, and air) on and near the Site.

(ii) The Respondents shall compile existing data which resulted from any previous sampling events that may have been conducted on and near the Site. The Respondents shall gather existing data which describe previous responses that have been conducted on and near the Site by local, state, federal, or private parties.

(iii) The Respondents shall gather existing information regarding physiography, geology, hydrogeology, hydrology, meteorology, and ecology of the Site.

(iv) The Respondents shall gather existing data regarding background ground water, background soil, background surface water, background sediments, and background air characteristics.

(v) The Respondents shall gather existing data regarding demographics and land use.

(vi) The Respondents shall gather existing data which identify and locate residential, municipal, or industrial wells on and near the Site. The Respondents shall gather existing data which identify surface water uses for areas surrounding the Site including, but not limited to, downstream of the Site.

(vii) The Respondents shall gather existing information describing the flora and fauna of the Site. The Respondents shall gather existing data regarding threatened, endangered, or rare species, sensitive environmental areas, or critical habitats on and near the Site. The Respondent shall compile existing results from any previous biological testing to document any known ecological effect such as acute or chronic toxicity or bioaccumulation in the food chain.

(viii) The Respondents shall use data compiled and reviewed to describe additional data needed to characterize the Site, to better define potential applicable or relevant and appropriate requirements (ARARs), and to develop a range of preliminarily identified remedial alternatives.

Task 2: <u>Remedial Investigation and Feasibility Study Work Plan</u>

24. The Respondents shall prepare and submit a ***Draft RI/FS Work Plan*** within **one two hundred forty (240) calender days** after the Effective Date of the AOC. [COMMENT: The expanded time frame from the effective date of the AOC to the submittal of the Draft RI/FS Work Plan is requested to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.]

25. The Respondents shall prepare and submit to the EPA a ***Final RI/FS Work Plan*** within **thirty (30) calendar days** after the receipt of the EPA's comments on the Draft Work Plan that is responsive to the directions in EPA's comments.

26. The Respondents shall use information from appropriate EPA guidance and technical direction provided by the EPA's Remedial Project Manager as the basis for preparing the RI/FS Work Plan.

27. The Respondents shall develop the Draft RI/FS Work Plan (WP) in conjunction with the Draft RI/FS Sampling and Analysis Plan (Task 3, RI/FS Sampling and Analysis Plan) and the Draft RI/FS Site Health and Safety Plan (Task 4, RI/FS Site Health and Safety Plan), although each plan may be submitted to the EPA under separate cover. The Draft RI/FS WP shall include a comprehensive description of the Work to be performed, the methodologies to be utilized, and a corresponding schedule for completion. In addition, the Draft RI/FS WP shall include the rationale for performing the required activities.

28. Specifically, the Draft RI/FS WP shall present a statement of the problem(s) and potential problem(s) posed by the Site and the objectives of the RI/FS. Furthermore, the Draft RI/FS WP shall include a Site background summary setting forth the Site description which includes the geographic location of the Site, and to the extent possible, a description of the Site's physiography, hydrology, geology, and demographics; the Site's ecological, cultural and natural resource features; a synopsis of the Site history and a description of previous responses that have been conducted at the Site by local, state, federal, or private parties; and a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the Site. In addition, the Draft RI/FS WP shall include a description of the site management strategy developed during scoping, and a preliminary identification of remedial alternatives and data needs for evaluation of remedial alternatives. The Draft RI/FS WP shall reflect coordination with treatability study requirements (Task 8, Treatability Studies), to the extent treatability testing is required, and will show a process for and manner of identifying Federal and State chemical, location, and action-specific ARARs.

29. The Draft RI/FS WP shall include a Preliminary Conceptual Site Model (CSM). The CSM is a representation of the site that documents current site conditions. The intent of the CSM is to provide input into the Sampling and Analysis Plans. It identifies possible source areas and affected media, characterizes the distribution of contaminant concentrations across the site, and identifies all potential exposure pathways, migration routes, and potential receptors. The CSM identifies the anticipated future land use, potential ground water use, and is initially developed from existing site data. The CSM is a key component of the RI/FS and shall be revised as new Site investigations produce updated or more accurate information. Specifically, the CSM will be used to: (1) identify data needs that will be targeted during the RI/FS; (2) identify exposure pathways or contaminates for which current data are useable in terms of quality and quantity, to quantify exposures and assess risk; and (3) develop a preliminary list of potential contaminants of concern.

30. Finally, the major part of the Draft RI/FS WP shall be a detailed description of the Tasks (Tasks 1-10) to be performed, information needed for each Task and for the Baseline Risk Assessments, information to be produced during and at the conclusion of each Task, and a description of the Work products and deliverables that the Respondents will submit to the EPA. This includes the deliverables set forth in the remainder of this SOW; a schedule for each of the required activities which is consistent with this SOW; a project management plan, including a data management plan (e.g., requirements for project management systems and software, minimum data requirements, data format and backup data management) and monthly reports to the EPA; and meetings and presentations to the EPA at the conclusion of each major phase of the RI/FS. The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the suggested RI/FS WP format and content.

31. The Respondents are responsible for fulfilling additional data and analysis needs identified by the EPA consistent with the general scope and objectives of this RI/FS. Because of the nature of the Site and the iterative nature of the RI/FS, additional data requirements and analyses may be identified throughout the process. If any significant additional Work is required to meet the objectives stated in the RI/FS WP, based upon new information obtained during the RI/FS, the Respondents shall submit a Draft RI/FS WP Amendment to the EPA for review and approval prior to any additional Work being conducted in accordance with the AOC and SOW. The EPA may, at its discretion, give verbal approval for Work to be conducted prior to providing written approval of the Draft RI/FS WP Amendment.

Task 3: <u>RI/FS Sampling and Analysis Plan</u>

32. The Respondents shall prepare a ***Draft RI/FS Sampling and Analysis Plan (SAP)*** within **two hundred forty (240) calendar days** after the Effective Date of the AOC. [COMMENT: The expanded time frame from the effective date of the AOC to the submittal of the Draft RI/FS SAP is requested to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.]

33. The Respondents shall prepare and submit to the EPA a ***Final RI/FS Sampling and Analysis Plan (SAP)*** within **thirty (30) calendar days** after the receipt of the EPA's comments on the draft plan that is responsive to the directions in EPA's comments.

34. The Draft RI/FS SAP shall provide a mechanism for planning field activities and shall consist of an RI/FS Field Sampling Plan and Quality Assurance Project Plan as follows:

a. RI/FS Field Sampling Plan (FSP)- The RI/FS FSP shall define in detail the sampling and data gathering methods that will be used for the project to define the nature and extent of contamination and ecological risk assessment-related studies (Task 7, Risk Assessments). It shall include, but not be limited to, sampling objectives, sample rational, location and frequency, sampling equipment and procedures, and sample handling and analysis. The RI/FS FSP shall contain a completed Sample Design Collection Worksheet and a Method Selection Worksheet. These worksheet templates can be found in the EPA's guidance document titled "Guidance for Data Useability in Risk Assessment" (EPA 1992a). The Respondents shall provide a strategy that meets the identified data quality objectives. The human health and ecological risk assessments require that the sampling be conducted to demonstrate that the data are statistically representative of the Site. The Respondents shall also confirm that the detection limits for all laboratories are in accordance within the goals stated in the EPA's risk assessment guidance. The FSP shall consider the use of all existing data and shall justify the need for additional data whenever existing data will meet the same objective. The FSP shall be written so that a field sampling team unfamiliar with the Site would be able to gather the samples and field information required. The Respondents shall refer to EPA's guidance documents titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the suggested RI/FS FSP format and content.

b. RI/FS Quality Assurance Project Plan (QAPP) - The RI/FS QAPP shall describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that will be used to achieve the desired Data Quality Objectives (DQOs). The DQOs shall at a minimum reflect

use of analytical methods for identifying contamination and remediating contamination consistent with the levels for remedial action objectives identified in the NCP. In addition, the RI/FS QAPP shall address sampling procedures, sample custody, analytical procedures, data reduction, data validation, data reporting, and personnel qualifications. The Respondents shall refer to EPA's guidance documents titled "EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5" (EPA 1998b) and "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5" (EPA 2001), which describes the suggested RI/FS QAPP format and content.

35. The Respondents shall demonstrate in advance, to the EPA's satisfaction, that each analytical laboratory it may use is qualified to conduct the proposed Work. This includes use of methods and analytical protocols for the chemicals of concern in the media of interest within detection and quantification limits consistent with both QA/QC procedures and the DQOs approved in the RI/FS QAPP for the Site by the EPA. The laboratory must have, and follow, an approved QA program. If a laboratory not in the Contract Laboratory Program (CLP) is selected, methods consistent with CLP methods shall be used where appropriate. Any methods not consistent with CLP methods shall be approved by EPA prior to their use. Furthermore, if a laboratory not in the CLP program is selected, a laboratory QA program must be submitted to the EPA for review and approval. The EPA may require the Respondents to submit detailed information to demonstrate that the laboratory is qualified to conduct the Work, including information on personnel and qualifications, equipment, and material specifications.

Task 4: <u>RI/FS Site Health and Safety Plan</u>

36. The Respondents shall prepare and submit to the EPA an ***RI/FS Site Health and Safety Plan (HSP)*** within **two hundred forty (240) calendar days** after the Effective Date of this AOC. [COMMENT: The expanded time frame from the effective date of the AOC to the submittal of the RI/FS HSP is requested to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.]

37. A HSP that is in compliance with Occupational Safety and Health Administration and EPA requirements must be in place prior to any onsite activities. The EPA will review, but not approve, the RI/FS Site HSP. In addition, EPA may require a revised RI/FS Site HSP to be submitted for review in the event that the RI/FS WP is changed or amended (e.g., such as in the performance of pilot studies which may result in the airborne emissions of hazardous substances from the Site). The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial

Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the suggested RI/FS Site HSP format and content.

Task 5: Community Relations Plan

38. The development and implementation of community relations activities, including conducting community interviews and developing a community relations plan, are the responsibilities of EPA. Respondents must assist as required by EPA by providing information regarding the Site's history, preparing meeting visual aids as required, participating in public meetings, dissemination of news releases, and/or by preparing fact sheets for distribution to the general public. In addition, EPA may require that Respondents establish a community information repository at or near the Site to house one copy of the administrative record. The extent of Respondents' involvement in community relations activities is left to the discretion of EPA. Respondents' community relations responsibilities, if any, are specified in the community relations plan. All community relations activities will be subject to oversight by EPA.

39. The Respondents shall make arrangements for public meetings and workshops as directed by EPA, including, but not limited to, the selection and reservation of a meeting space, and providing the necessary audio-visual equipment including screens, overhead projectors, and computer projectors.

40. The Respondents shall reserve a court reporter for public meetings regarding the Proposed Plan. A full page original and a 3.5 inch computer disk in Word Perfect format, or a CD, of the transcripts shall be provided to EPA (three copies), with additional copies provided to the State and the Site information repository.

Task 6: Site Characterization

41. As part of the Remedial Investigation (RI), the Respondents shall perform the activities described in this Task, including the preparation of a RI Report (Task 9, Remedial Investigation Report). The overall objective of the Site's characterization will be to describe areas of the Site that may pose a threat to human health or the environment. This will be accomplished by first determining the Site's physiography, geology, and hydrology. Surface and subsurface pathways of migration shall be defined by the Respondents. The Respondents shall identify the sources of contamination and define the nature, extent, and volume of the sources of contamination, including their physical and chemical constituents. The Respondents shall also investigate the extent of migration of this contamination as well as its volume and any changes in its physical or chemical characteristics, to provide for a comprehensive understanding of the nature and extent of contamination at the Site. Using this information, Respondents will then determine and project the contaminant fate and transport.

42. The Respondents shall implement the Final RI/FS WP, and SAP during this phase of the RI/FS. Field data will be collected and analyzed to provide the information required to accomplish the objectives of the study. The Respondents shall notify the EPA at least **ten (10) calendar days** in advance of the field work regarding the planned dates for field activities, potentially including, but not limited to, ecological field surveys, field layout of the sampling grid, installation of wells, initiating sampling (air, surface water, ground water, sediments, soils, sludges, and biota), installation and calibration of equipment, aquifer tests, and initiation of analysis and other field investigation activities (including geophysical surveys and borehole geophysics). The Respondents shall demonstrate that the laboratory and type of laboratory analyses that will be utilized during the Site's characterization meets the specific QA/QC requirements and the DQOs of the investigation of the Site as specified in the Final RI/FS SAP. Activities are often iterative, and to satisfy the objectives of the RI/FS, it may be necessary for the Respondents to supplement the Work specified in the Final RI/FS WP.

43. The Respondents shall perform the following activities as part of Task 6 (Site Characterization):

a. Field Investigation - The field investigation shall include the gathering of data to define the Site's physical and biological characteristics, sources of contamination, and the nature, extent, fate, and transport of contamination at the Site. These activities shall be performed by the Respondents in accordance with the Final RI/FS WP and SAP. As appropriate, this field investigation may address the following:

(i) Implementation and Documentation of Field Support Activities - The Respondents shall initiate field support activities following the Final RI/FS WP and SAP approval by the EPA. Field support activities may include obtaining access to the Site, scheduling, and procurement of equipment, office space, laboratory services, and/or contractors.

(ii) Investigation and Definition of Site Physical and Biological Characteristics - The Respondents shall collect data on the physical and biological characteristics of the Site and its surrounding areas including the physiography, geology, hydrology, and specific physical characteristics. This information shall be ascertained through a combination of physical measurements, observations, and sampling efforts, and will be utilized to define potential transport pathways and human and ecological receptor populations (including risks to endangered or threatened species). In defining the Site's physical characteristics, the Respondents may also obtain sufficient engineering data for the projection of contaminant fate

and transport and development and screening of remedial action alternatives, including information to assess treatment technologies, as necessary.

(iii) Surveying and Mapping of the Site - The Respondents shall develop a map of the Site that includes topographic information and physical features on and near the Site. If no detailed topographic map for the Site exists, a survey of the Site shall be conducted, as needed.

(iv) Existing Well Inventory and Survey - The Respondents shall inventory and survey existing monitoring, residential, water supply, and industrial wells located within one mile of the Site. As available, the well information provided shall include the location, elevation, construction details including total depth and screened interval, aquifer name, use, and lithology (as determined from available well drilling records).

(v) Waste Characterization - The Respondents shall determine the location, type, and quantities as well as the physical or chemical characteristics of any waste remaining at the Site after the surface removal action has been completed. If hazardous substances are held in containment vessels, the integrity of the containment structure and the characteristics of the contents shall be determined, to the extent such information is necessary to assess potential risks at the Site and facilitate the development and screening of remedial action alternatives.

(vi) Definition of Sources of Contamination - The Respondents shall locate each source of contamination. The physical characteristics and chemical constituents and their concentrations will be determined for all known and discovered sources of contamination. The Respondents shall conduct sufficient sampling to define the boundaries of the contaminant sources to the level established in the Final RI/FS QAPP and DQOs. Defining the source of contamination may include analyzing the potential for contaminant release (e.g., long-term leaching from soil), contaminant mobility and persistence, and characteristics important for evaluating remedial actions, including information to assess treatment technologies as necessary.

(vii) Description of the Nature and Extent of Contamination - The Respondent shall gather information to describe the nature and extent of contamination as a final step during the field investigation. This information may also include soil contaminant retention capacity and mechanisms, ground water recharge and discharge areas, and ground water flow direction and rate at

the Site. To describe the nature and extent of contamination, the Respondents shall implement an iterative sampling and monitoring program, and any study program identified in the Final RI/FS WP or SAP, such that by using analytical techniques sufficient to detect and quantify the horizontal and vertical concentration profiles of any potential contaminants, including any degradation or daughter contaminants, the migration of contaminants through the various media at the Site can be determined.

(viii) In addition, the Respondents shall gather data for calculations of contaminant fate and transport, if appropriate.

(ix) This process shall be continued until the area and depth of contamination are known, based on validated data, to the level of contamination established in the Final RI/FS QAPP and DQOs. The Respondents shall describe the factors influencing contaminant movement and prepare an extrapolation of future contaminant movement, if necessary. The information on the nature and extent of contamination will be used to determine the level of risk presented by the Site and to help determine aspects of the appropriate remedial action alternatives to be evaluated.

b. Data Analyses - The Respondents shall analyze the data collected and refine the Conceptual Site Model by presenting and analyzing validated data on source characteristics, the nature and extent of contamination, the transport pathways and fate of the contaminants present at the Site, and the effects on human health and the environment:

(i) Evaluation of Site Characteristics - The Respondent shall analyze and evaluate the data to describe the Site's physical and biological characteristics, contaminant source characteristics, nature and extent of contamination, and contaminant fate and transport. Results of the Site's physical characteristics, source characteristics, and extent of contamination analyses are utilized in the analysis of contaminant fate and transport. The evaluation will include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as the mobility and persistence of the contaminants. Where modeling is appropriate, such models shall be identified by the Respondents to the EPA in a ***Technical Memorandum on Modeling of Site Characteristics*** prior to their use. If EPA disapproves of or requires revisions to the technical memorandum, in whole or in part, Respondents shall amend and submit to EPA a revised technical memorandum on

modeling which is responsive to directions and EPA comments within **thirty (30) calendar days** of receipt of EPA's comments.

All data and programming, including any proprietary programs, shall be made available to the EPA together with a sensitivity analysis. The RI data shall be presented in a format to facilitate the Respondents' preparation of the Baseline Human Health and Ecological Risk Assessments (Task 7, Risk Assessments). All data shall be archived in such a format that would be accessible to investigators as needed.

The Respondents shall agree to discuss and then collect information as necessary to address any data gaps identified by the EPA consistent with the DQO process. Also, this evaluation shall provide any information relevant to the Site's characteristics necessary for evaluation of the need for remedial action in the risk assessments and for the development and evaluation of remedial alternatives. Analyses of data collected for the Site's characterization shall meet the DQOs developed in the Final RI/FS QAPP and stated in the Final RI/FS SAP (or revised during the RI).

c. Data Management Procedures - The Respondents shall consistently document the quality and validity of field and laboratory data compiled during the RI as follows:

(i) Documentation of Field Activities - Information gathered during the Site's characterization shall be consistently documented and adequately recorded by the Respondents in well maintained field logs and laboratory reports. The method(s) of documentation shall be specified in the Final RI/FS WP and/or the SAP. Field logs shall be utilized to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports shall document sample custody, analytical responsibility and results, adherence to prescribed protocols, non-conformity events, corrective measures, and data deficiencies.

(ii) Sample Management and Tracking - The Respondents shall maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported and utilized in the risk assessments and the development and evaluation of remedial alternatives. Analytical results developed under the Final RI/FS WP shall not be included in any characterization reports of the Site unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the Respondent shall establish a data security system to

safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

Task 7: Risk Assessments

44. The Respondents shall perform a Baseline Human Health Risk Assessment (BHHRA), Screening Level Ecological Risk Assessment, and a Baseline Ecological Risk Assessment (if necessary) for the Site. The Respondent will prepare one section of the Final RI/FS WP (Task 2) which discusses the risk assessment process and outlines the steps necessary for coordinating with the EPA at key decision points within the process. Submittal of deliverables, meetings and/or conference calls, and presentations to the EPA will be reflected in the project schedule in the Final RI/FS WP to demonstrate the progress made on the risk assessments. The DQOs listed within the Final RI/FS QAPP will include DQOs specific to risk assessment needs, and critical samples needed for the risk assessments will be so identified within the Final RI/FS SAP. These risk assessments shall consist of both Human Health and Ecological Risk Assessments as follows:

a. Baseline Human Health Risk Assessment - The Respondents shall perform a BHHRA to evaluate and assess the risk to human health posed by the contaminants present at the Site. The Respondent shall refer to the appropriate EPA guidance documents (EPA 1989b, 1991a, 1991b, 1991c, 1992a, and 1998a) in conducting the BHHRA. The Respondents shall address the following in the BHHRA:

(i) Hazard Identification (sources)/Dose-Response Assessment - During performance of site characterization activities, the Respondents shall review available information on the hazardous substances present at the Site and identify the major contaminants of concern. The Respondents, with concurrence from the EPA, shall select contaminants of concern based on their intrinsic toxicological properties.

(ii) Respondents shall include in the BHHRA Report a list of hazardous substances present at the Site (i.e., chemicals of concern as described in the Risk Assessment Guidance for Superfund).

(iii) Conceptual Exposure/Pathway Analysis - The Respondents shall identify and analyze actual and potential exposure pathways. The proximity of contaminants to exposure pathways and their potential to migrate into critical exposure pathways shall be assessed.

(iv) Characterization of Site and Potential Receptors - The Respondents shall identify and characterize human populations in the exposure pathways.

(v) During the exposure assessment, the Respondents shall identify the magnitude of actual or potential human exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment shall include an evaluation of the likelihood of such exposures occurring and shall provide the basis for the development of acceptable exposure levels. In developing the exposure assessment, the Respondents shall develop reasonable maximum estimates of exposure for both current land use conditions and potential future land use conditions at the Site. The BHHRA Report shall describe the exposure scenarios, assumptions, fate and transport models, and data.

(vi) Risk Characterization - During risk characterization, the Respondents shall compare chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment, to measured levels of contaminant exposure levels and the levels predicted through environmental fate and transport modeling. These comparisons shall determine whether concentrations of contaminants at or near the Site are affecting or could potentially affect human health.

For chemicals lacking an EPA toxicity value, Respondents shall work with EPA to identify an appropriate surrogate toxicity factor or other means to evaluate risk.

(vii) Identification of Limitations/Uncertainties - The Respondents shall identify critical assumptions (e.g., background concentrations and conditions) and uncertainties in the BHHRA.

(viii) Conceptual Site Model - Based on contaminant identification, exposure assessment, toxicity assessment, and risk characterization, the Respondents shall update the Conceptual Site Model for the Site.

b. No later than **ninety (90) calender days** following receipt of EPA approval of the Final RI Report, the Respondents shall prepare and submit to the EPA for review and approval a ***Draft Baseline Human Health Risk Assessment (BHHRA) Report***.

c. The Respondents shall submit a ***Final Baseline Human Health Risk Assessment (BHHRA) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of receipt of the EPA's comments on the draft report.

d. The Respondents shall prepare and submit an Ecological Risk Assessment (ERA) Report that is consistent with applicable guidance from Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments, (U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997) and other current EPA guidance, including but not limited to EPA 1989b, EPA 1992a, EPA 1992b, and EPA 1993. The scoping of all phases of the ERA shall follow the general approach provided in applicable sections of EPA 1992b and shall include discussions between the Respondents' and the EPA's risk assessors and risk managers.

The Baseline Ecological Risk Assessment process will be identified and discussed as part of the RI/FS WP. Using existing data, a preliminary ecological Conceptual Site Model will be developed in the RI/FS WP to identify data needs. The necessary data will be collected as part of the RI and these data will be used in the Baseline Ecological Risk Assessment (BERA).

The eight steps in the Baseline Ecological Risk Assessment (BERA) process include: Step 1 - Screening-Level Problem Formulation and Ecological Effects Evaluation, Step 2 - Screening-Level Preliminary Exposure Estimate and Risk Calculation, and submittal of a Screening Level Ecological Risk Assessment (SLERA) Report, and continues with, if necessary, Step 3 - Baseline Risk Assessment Problem Formulation, Step 4 - Study Design and Data Quality Objectives, and submittal of a ecological risk assessment work plan, Step 5 - Field Verification and Sampling Design, Step 6 - Site Investigation and Analysis of Exposure and Effects, Step 7 - Risk Characterization and submittal of the Baseline Ecological Risk Assessment (BERA) Report, and Step 8 - Risk Management. The Respondents shall perform the BERA in accordance with the applicable sections of appropriate EPA's guidance documents (EPA 1992a, 1997, and 1998a). The Respondents shall interact closely with the EPA's Remedial Project Manager and risk assessment staff assigned to the Site to ensure that draft deliverables are acceptable and major rework is avoided on subsequent submittals. The scope of the BERA will be determined via a phased approach as outlined in the EPA's guidance documents.

(i) Steps 1 and 2 (the Screening-Level Problem Formulation and Ecological Effects Evaluation and Screening-Level Preliminary Exposure Estimate and Risk Calculation). The deliverable for these steps will be a ***Draft***

Screening Level Ecological Risk Assessment (SLERA) Report, which will be submitted to EPA for review and approval within **ninety (90) calendar days** following approval of the Final RI Report. The SLERA will use site data with ecotoxicity screening criteria to estimate potential ecological risks and identify any bio-accumulative contaminants present at the Site using Table 3-1 of Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas (TCEQ), December 2001. The Respondents shall submit a ***Final Screening Level Ecological Risk Assessment (SLERA) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of receipt of EPA's comments on the draft report.

(ii) At the conclusion of Steps 1 and 2, the Respondents shall decide, with concurrence from the EPA, that either the screening-level ecological risk assessment is adequate to determine that ecological threats are negligible, or the process should continue to a more detailed ecological risk assessment (Steps 3 through 7). If the process continues, the screening-level assessment serves to identify exposure pathways and preliminary contaminants of concern for the BERA by eliminating those contaminants and exposure pathways that pose negligible risks. This process can also be used to identify critical pathways or media and cleanup levels if a more detailed evaluation is not warranted or desired.

(iii) Steps 3 through 7 and any deliverables associated with these steps will be developed as needed, at the direction of and in conjunction with EPA. It is believed that if additional ecological risk characterization is necessary, the problem formulation step and additional sampling will be unique enough to not be tied to the RI and other deliverables. Risk characterization using these data will be described in a ***Draft Baseline Ecological Risk Assessment (BERA) Report***, which will be submitted to the EPA for review and approval **ninety (90) calendar days** following validation of these data. Respondents shall submit a Final ***Baseline Ecological Risk Assessment (BERA) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of the EPA's comments on the draft report.

(iv) Step 8 - Risk Management - "Risk Management" at the Site will be the responsibility of the EPA's Remedial Project Manager, who must balance risk reductions associated with cleanup of contaminants with potential impacts of the remedial actions themselves. In Step 7, a threshold for effects on the assessment endpoint as a range between contamination levels identified as posing no ecological risk and the lowest contamination

levels identified as likely to produce adverse ecological effects will be identified. In Step 8, the EPA's Remedial Project Manager will evaluate several factors in deciding whether or not to clean up to within that range. This risk management decision will be finalized by the EPA in the Record of Decision for the Site.

Task 8: Treatability Studies

45. Treatability testing shall be performed, if required by EPA, by the Respondents to assist in the detailed analysis of alternatives. In addition, if applicable, testing results and operating conditions shall be used in the detailed design of the selected remedial technology. The following activities shall be performed by the Respondents:

a. Determination of Candidate Technologies and of the Need for Testing - The Respondents shall identify the candidate technologies for a treatability studies program. Treatability studies may consist of laboratory screening, bench-scale testing, and/or pilot-scale testing. The listing of candidate technologies will cover the range of technologies required for alternatives analysis. The specific data requirements for the testing program will be determined and refined during the characterization of the Site and the development and screening of remedial alternatives. The Respondent shall perform the following activities:

(i) Determination of the Need for Treatability Testing. If practical technologies have not been sufficiently demonstrated or cannot be adequately evaluated for this Site on the basis of available information, treatability testing may need to be conducted. Where it is determined by the EPA that treatability testing is required, and unless the Respondents can demonstrate to the EPA's satisfaction that they are not needed, the Respondents shall be required to submit a Treatability Study Work Plan to the EPA proposing the type(s) of treatability study to be conducted (i.e., laboratory screening, bench-scale testing, and/or pilot-scale testing), and outlining the steps and data necessary to initiate and evaluate the treatability testing program.

(ii) The Respondents shall submit a ***Draft Treatability Study (TS) Work Plan***, which includes a Sampling and Analysis Plan (SAP) and Health and Safety Plan, within **sixty (60) calendar days** after the receipt of the notice from the EPA that treatability studies are required.

(iii) The Respondents shall submit a ***Final Treatability Study (TS) Work Plan*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of the EPA's comments on the draft work

plan.

(iv) The Respondents shall submit a ***Draft Treatability Study (TS) Report*** to the EPA for review and approval according to the project schedule in the Final Treatability Study Work Plan.

(v) The Respondents shall submit a ***Final Treatability Study (TS) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of the EPA's comments on the draft report. This Report shall evaluate the technology's effectiveness and implementability in relation to the Preliminary Remediation Goals established for the Site. Actual results must be compared with predicted results to justify effectiveness and implementability discussions.

Task 9: Remedial Investigation Report

46. No later than **ninety (90) calendar days** following receipt of all validated sample analytical results from the laboratory (except for supplemental ecological sampling data), the Respondents shall prepare and submit a ***Draft Remedial Investigation (RI) Report***.

47. The Respondents shall submit a ***Final Remedial Investigation (RI) Report*** that is responsive to the directions in EPA's comments within **sixty (60) calendar days** of the receipt of the EPA's comments on the draft report.

48. The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b). The information shall include a summary of the results of the field activities to characterize the Site, classification of ground water beneath the Site, nature and extent of contamination, and appropriate site-specific discussions for fate and transport of contaminants.

49. The Respondents shall conduct a presentation to the EPA within **fifteen (15) calendar days** following submission of the Final RI Report. At this presentation, the Respondents shall present and discuss the findings of the RI, Remedial Action Objectives, candidate technologies and remedy alternatives envisioned for the FS, and the comparative analysis.

Task 10: Feasibility Study

50. The Respondents shall perform a Feasibility Study (FS) as specified in this SOW. The FS shall include, but not be limited to, the development and screening of alternatives for remedial action, a detailed analysis of alternatives for remedial action, submittal of Draft

and Final FS Reports, and other reports/memoranda as follows:

51. No later than **sixty(60) calendar days** after receipt of EPA approval of the Final BHHRA Report or the Final BERA Report (whichever is later), the Respondents shall submit to EPA for review and approval a ***Draft Feasibility Study (FS) Report.***

52. The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b), specifically Table 6-5 (Suggested FS Report Format) for FS Report content and format.

53. The FS Report shall include a detailed analysis of remedial alternatives for the candidate remedies identified during the screening process. This detailed analysis shall follow the applicable sections of EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) and other appropriate guidance documents. The major components of the analysis of alternatives for remedial action shall consist of an analysis of each option against a set of evaluation criteria and a separate discussion for the comparative analysis of all options with respect to each other in a manner consistent with the NCP. The Respondents shall not consider state and community acceptance during the analysis of alternatives. The EPA will perform the analysis of these two criteria.

54. The nine evaluation criteria used to evaluate the different remediation alternatives individually and against each other in order to select a remedy include the following:

    a. Overall protection of human health and the environment;
    b. Compliance with ARARs;
    c. Long-term effectiveness and permanence;
    d. Reduction of toxicity, mobility, or volume;
    e. Short-term effectiveness;
    f. Implementability;
    g. Cost;
    h. State acceptance; and
    i. Community acceptance.

55. The FS Report shall provide the basis for the Proposed Plan developed by the EPA under CERCLA and shall document the development and analysis of remedial alternatives. The Draft FS Report may be subject to change following comments received during the public comment period on the EPA's Proposed Plan. The EPA will forward any comments pertinent to the content of the Draft FS Report to the Respondents. The Respondents shall submit a ***Final FS Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of these comments.

APPENDIX B-1

SCHEDULE OF DELIVERABLES/MEETINGS

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
GULFCO MARINE MAINTENANCE SUPERFUND SITE

DELIVERABLES/MEETINGS	DUE DATES (CALENDAR DAYS)
1. Removal Action Consent Order / Statement of Work Development Meeting	Meeting to occur within fifteen (15) days after the Effective Date of the AOC.
2. Scoping Phase Meeting	Meeting to occur within one hundred ninety-five (195) days after the Effective Date of the AOC.
3. RI/FS Site Health and Safety Plan	Plan due within two hundred forty (240) days after the Effective Date of the AOC. Plan must be in place prior to any onsite RI/FS activities.
4. Screening Level Ecological Risk Assessment (SLERA) Report	Draft due within ninety (90) days after receipt of EPA approval of the Final RI Report. Final due within thirty (30) days of the receipt of the EPA's comments.
5. RI/FS Work Plan	Draft due within two hundred forty (240) days after the Effective Date of the AOC. Final due within thirty (30) days after the receipt of the EPA's comments.
6. RI/FS Sampling and Analysis Plan	Draft due within two hundred forty (240) days after the Effective Date of the AOC. Final due within thirty (30) days after the receipt of the EPA's comments.
7. Technical Memorandum on Modeling of Site Characteristics.	Draft due when Respondents propose that modeling is appropriate. Final due within thirty (30) days after receipt of the EPA's comments.
8. Baseline Human Health Risk Assessment Report	Draft due within ninety (90) days after receipt of EPA approval of Final RI Report. Final due within thirty (30) days of the receipt of the EPA's comments.
9. Baseline Ecological Risk Assessment Report	If prepared, draft due within ninety (90) days after validation of supplemental ecological sampling data. Final due within thirty (30) days of the receipt of the EPA's comments.
10. Treatability Study Work Plan	Draft due within sixty (60) days of the receipt of EPA's notice that treatability studies are required. Final due within thirty (30) days of the receipt of the EPA's comments.

DELIVERABLES/MEETINGS	DUE DATES (CALENDAR DAYS)
11. Treatability Study Report	Draft due as specified in the Final Treatability Study Work Plan. Final due within thirty (30) days of the receipt of the EPA's comments.
12. Remedial Investigation (RI) Report	Draft due within ninety (90) days after receipt of all validated laboratory data (except supplemental ecological sampling data). Final due within sixty (60) days of the receipt of the EPA's comments.
13. Presentation to the EPA	Within fifteen (15) days after submission of the Final RI Report.
14. Draft Feasibility Study (FS) Report	Draft due within sixty (60) days after receipt of EPA approval of BHHRA Report or BERA Report (whichever is later).
15. Final Feasibility Study Report	Due thirty (30) days after receipt of EPA comments following public comment period.
16. Monthly Progress Reports	Initially due as specified in the RI/FS Work Plan. Thereafter, due by the tenth day of the following month.

APPENDIX B-2

POTENTIAL GUIDANCE DOCUMENTS

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
GULFCO MARINE MAINTENANCE SUPERFUND SITE

The following list, although not comprehensive, comprises many of the regulations and guidance documents that may potentially apply to the RI/FS process:

1. The (revised) National Contingency Plan

2. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, " U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 9355.3-01

3. "Interim Guidance on Potentially Responsible Party Participation in Remedial Investigation and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER Directive No. 9355.3-01.

4. "Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume I" U.S. EPA, Office of Waste Programs Enforcement, July 1, 1991, OSWER Directive No. 9835.31(c).

5. "Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume II" U.S. EPA, Office of Waste Programs Enforcement, July 1, 1991, OSWER Directive No. 9835.1(d).

6. "A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

7. "Guidance for the Data Quality Objectives Process (QA/G-4)," (EPA/600/R-96/055, August 2000).

8. "Guidance for the Data Quality Objectives Process for Hazardous Waste Sites (QA/G-4HW)," (EPA/600/R-00/007, January 2000).

9. "Guidance for the Preparation of Standard Operating Procedures (QA-G-6),"(EPA/240/B-01/004, March 2001).

10. "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001).

11. "EPA Requirements for Quality Assurance Project Plans (QA/R-5)" (EPA/240/B-01/003,March 2001).

12. "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA 600/R-98/018, Febraruy1998).

13. "User's Guide to the EPA Contract Laboratory," U.S. EPA, Sample Management Office, January 1991, OSWER Directive No. 9240.0-01D

14. "CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (draft), OSWER Directive No. 9234.1-01 and -02.

15. "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response,(draft), OSWER Directive No. 9283.1-2.

16. "Draft Guidance on Superfund Decision Documents," U.S. EPA, Office of Emergency and Remedial Response, March 1988, OSWER Directive No. 9355-02.

17. "Risk Assessment Guidance for Superfund - Volume I, Human Health Evaluation Manual (Part A), EPA/540/1-89/002.

18. "Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part B), Development of Risk-Based Preliminary Remediating Goals." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-01B. December 1991.

19. "Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part C), Risk Evaluation of Remedial Alternatives." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-01C. 1991.

20. "Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors." Office of Emergency and Remedial Response. OSWER Directive No. 9235.6-03, March 1991.

21. "Guidance for Data Useability in Risk Assessment." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-09A. April 1992 (and Memorandum from Henry L. Longest dated June 2, 1992).

22. "Supplemental Guidance to RAGS: Calculating the Concentration Term." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-081. May 1992.

23. "Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments," U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997.

24. "Guidance for Data Useability in Risk Assessment," October, 1990, EPA/540/G-90/008

25. "Performance of Risk Assessments in Remedial Investigation/Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs),"August 28, 1990, OSWER Directive No.9835.15.

26. "Supplemental Guidance on Performing Risk Assessments in Remedial Investigation Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)," July2, 1991, OSWER Directive No. 9835.15(a).

27. "Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions," April 22, 1991, OSWER Directive No. 9355.0-30.

28. "Health and Safety Requirements of Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

29. OSHA Regulations in 29 CFR 1910.120 (Federal Register 45654, December19, 1986).

30. "Interim Guidance on Administrative Records for Selection of CERCLA Response Actions," U.S. EPA, Office of Waste Programs Enforcement, March1,1989, OSWER Directive No. 9833.3A.

31. "Community Relations in Superfund: A Handbook," U.S. EPA, Office of Emergency and Remedial

Response, January 1992, OSWER Directive No. 9230.0-3C.

32. "Community Relations During Enforcement Activities And Development of the Administrative Record," U.S. EPA, Office of Waste Programs Enforcement, November 1988, OSWER Directive No. 9836.0-1a.

33. "Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas," TCEQ, December 2001.

APPENDIX B-3

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
GULFCO MARINE MAINTENANCE SUPERFUND SITE

A preliminary list of probable Applicable or Relevant and Appropriate Requirements (ARARs) will be generated by the Respondents during the Remedial Investigation and Feasibility Study process. This list will be compiled according to established EPA guidance, research of existing regulations, and collection of site-specific information and data. Three types of ARARs will be identified:

1. Chemical-Specific ARARs: These ARARs are usually health or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment (e.g., maximum contaminant levels that establish safe levels in drinking water).

2. Location-Specific ARARs: These ARARs restrict actions or contaminant concentrations in certain environmentally sensitive areas. Examples of areas regulated under various Federal laws include flood plains, wetlands, and locations where endangered species or historically significant cultural resources are present.

3. Action-Specific ARARs: These ARARs are usually technology or activity-based requirements or limitations on actions or conditions involving specific substances.

Chemical and location-specific ARARs are identified early in the process, generally during the site investigation, while action-specific ARARs are usually identified during the Feasibility Study in the detailed analysis of alternatives.

APPENDIX B

DRAFT STATEMENT OF WORK
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

GULFCO MARINE MAINTENANCE SUPERFUND SITE
FREEPORT, BRAZORIA COUNTY, TEXAS

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APPENDIX B

DRAFT STATEMENT OF WORK (SOW)
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

GULFCO MARINE MAINTENANCE SUPERFUND SITE
FREEPORT, BRAZORIA COUNTY, TEXAS

I. INTRODUCTION

1. This Statement of Work (SOW) provides an overview of work that will be carried out by Respondents as they implement a Remedial Investigation and Feasibility Study (RI/FS) for the Gulfco Marine Maintenance Superfund Site (Site). This RI/FS SOW is attached to the Administrative Order on Consent (AOC) for the Site and is a supporting document for the AOC. Technical work described in the SOW is intended to provide more information to Respondents for purposes of implementing the AOC and is not intended to change the meaning of any AOC language. This SOW is also consistent with both the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the National Contingency Plan (NCP). Any discrepancies between the AOC and SOW are unintended, and whenever necessary, the AOC will control in any interpretive disputes.

2. The purpose of the RI/FS is to investigate the nature and extent of contamination for the Site, to assess the potential risk to human health and the environment, and to develop and evaluate potential remedial alternatives. The RI and FS are interactive and will be conducted concurrently, to the extent practicable, in a manner that allows information and data collected during the RI to influence the development of remedial alternatives during the FS, which in turn affect additional information and data needs and the scope of any necessary treatability studies and risk assessments.

3. Respondents will conduct the RI/FS and will produce draft RI and FS reports that are in accordance with the AOC. The RI/FS will be consistent with applicable guidance from the Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (U.S. EPA, Office of Emergency and Remedial Response, October 1988), Guidance for the Data Quality Objectives Process (EPA QA/G-4, August 2000), Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments (U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997), and other guidance that EPA uses in conducting an RI/FS (a list of ~~the primary~~potential guidance is attached). EPA is aware that not all guidance (including entire documents or sections of documents) used for the RI/FS purposes may be applicable to the Site. EPA Project Managers for sites have the authority under the NCP

to determine when application of any guidance would be inappropriate. Respondents may raise such guidance issues they consider appropriate during the implementation of the AOC. EPA's decisions regarding guidance applicability will be incorporated into document approval correspondence or in other written correspondence as appropriate.

4. The RI/FS Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA describes the suggested report format and ~~the required report~~ content for the draft RI and FS reports. Respondents will furnish all necessary personnel, materials, and services needed for, or incidental to, performing the RI/FS, except as otherwise specified in the AOC.

5. At the completion of the RI/FS, EPA will be responsible for the selection of a site remedy and will document this selection in one or more Records of Decision (ROD). The remedial action alternatives selected by EPA will meet the cleanup standards specified in Section 121 of CERCLA, 42 U.S.C. § 9621; the selected remedy will be protective of human health and the environment, will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements (ARARs), will be cost-effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable, and will address the statutory preference for treatment as a principal element, as appropriate under the NCP. The final RI/FS report, as approved by EPA, will, with the administrative record, form the basis for the selection of the Site's remedy and will provide the information necessary to support development of one or more RODs.

6. As specified in Section 104(a)(1) of CERCLA, 42 U.S.C. § 9604(a)(1), EPA will provide oversight of Respondents' activities throughout implementation of the AOC. Respondents will support EPA's initiation and conduct of activities related to implementation of oversight activities.

Purpose of the Statement of Work

7. This SOW sets forth certain requirements of the AOC for implementation of the Work pertaining to a RI/FS for the Site. The Respondents shall undertake the RI/FS according to the AOC, including, but not limited to, this SOW.

Objectives of the Remedial Investigation/Feasibility Study

8. The objectives of the RI/FS are to investigate the nature and extent of contamination at the Site and to develop and evaluate potential remedial alternatives, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, 42 U.S.C. § 9601, et seq.), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and in accordance with the National Oil and

Hazardous Substances Pollution Contingency Plan (National Contingency Plan). Specifically, these objectives are to determine the presence or absence, types, and quantities (concentrations) of contaminants; mechanism of contaminant release to pathway(s); direction of pathway(s) transport; boundaries of source(s) and pathway(s); and environmental/public health receptors.

Scope of the Remedial Investigation and Feasibility Study

9. The general scope of the RI/FS shall be to address all contamination at the Site resulting from the hazardous substances present at the Site.

Description of the Site

10. The Gulfco Site was a former barge cleaning, and servicing, ~~and waste disposal~~ facility located in Freeport, Texas. It operated from 1971 through 1998. Barges brought to the facility were cleaned of waste oils, caustics, and organic chemicals, and the wash waters generated during these operations were stored in three ~~unlined~~ surface impoundments, or earthen pits, with natural clay liners located on Lot 56 on the north side of Marlin Avenue. The three surface impoundments covered a total area of about 2.3 acres. ~~T~~With state approval, these impoundments were closed by partial removal of sludges, filling with clay, and covering with gravel or crushed shells in August 1982. Approximately 100 cubic yards of sludge was left in the surface impoundments following closure, primarily in surface impoundment No. 2. After 1981, waste wash waters were stored in a rented floating barge or aboveground storage tanks located at the Site. The dry dock area associated with Barge Slip 1 permitted a barge to be completely removed from the water for necessary repairs on its bottom or to sandblast and repaint the entire hull. The barge slips and dry dock area where barges are emptied and repaired incorporated no containment or levees to contain potential contaminant migration.

11. The Gulfco Site is located at 906 Marlin Avenue, Freeport, Brazoria County, Texas. The property consists of lots 21 through 25 and lots 55 through 58, Subdivision 8, of the Brazos Coast Investment Company. Marlin Avenue separates lots 55 through 58 on the north from lots 21 through 25 on the south. Lots 21 through 25 are approximately four acre tracts bordered on the south by the Intracoastal Waterway. Lots 55 through 58 are approximately five acre tracts. The entire property is about 40 acres in size.

12. ~~Contaminated soil identified at the Site is associated with barge servicing and cleaning operations. Specific areas of concern include~~Soil sampling activities performed at the Site by the Texas Natural Resource Conservation Commission (TNRCC)(now known as the Texas Commission on Environmental Quality) in January 2000 detected one or more hazardous substances above background concentrations or above the sample quantitation limit (for substances not detected in site-specific background samples) in soil samples

collected near two former sandblast areas, ~~the~~near a former drum storage area, ~~the~~near a former wash water storage area, ~~miscellaneous areas around the property, and adjacent to the former surface impoundments~~southeast of the former impoundments, and near a driveway area on Lot 57. In many cases, these reported detections were qualified as estimated concentrations because one or more quality control criteria had not been met.

13. The Site is located on the north bank of the Intracoastal Waterway between Oyster Creek on the east and the Old Brazos River Channel and the Dow Barge Canal on the west. The southern part of the Site, south of Marlin Avenue, drains toward the south where it enters into the Intracoastal Waterway. Areas north of Marlin Avenue are relatively level. Drainage from these areas is to the northeast into adjacent wetlands, then to Oyster Creek. The wetlands are directly adjacent to the surface impoundments on the north, east, and west, and are classified as intertidal, emergent, estuarine, persistent, and irregularly flooded. These wetlands extend approximately 0.48 miles to Oyster Creek. The Site is located within an area of 100-year coastal flood with velocity; or wave action.

~~14. Sampling results documented releases of~~

14. Ground water sampling activities performed at the Site by the TNRCC in January 2001 detected several hazardous substances ~~from the Site to the ground water~~above background concentrations or above the sample quantitation limit (for substances not detected in site-specific background samples) in ground water samples collected from temporary monitoring wells in the immediate vicinity of the former impoundments. A number of these detected concentrations were qualified as estimated because one or more quality control criteria had not been met. Ground water at the Site flows to the southeast. The closest water supply well (Well BH8106-303) is on the west adjacent property to the Site, and was used for a public marina until 1984. The well is 199 feet deep and is screened from a depth of 188 feet to 198 feet. ~~The City of Freeport was previously supplied by ground water from seven wells at depths of 200 feet. These wells were used until 1989 when they were replaced by surface water reservoirs, and subsequently the wells were used as a backup system.~~

15. The Site was proposed for listing on the National Priorities List ("NPL") on September 5, 2002 (67 FR 56794), and was placed on the NPL effective May 30, 2003, in a final rulemaking published on April 30, 2003 (68 FR 23077).

II. PERFORMANCE STANDARDS

16. The Performance Standards for this RI/FS shall include substantive requirements, criteria, or limitations which are specified in the AOC, including, but not limited to, this SOW. Submissions approved by the EPA are an enforceable part of the AOC; consequently, cleanup goals and other substantive requirements, criteria, or limitations

which are specified in EPA-approved submissions are Performance Standards. The EPA will use the Performance Standards to determine if the work, including, but not limited to, the RI/FS, has been completed. The Respondents shall ensure that the RI/FS is consistent with applicable sections of the EPA's "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b, hereinafter "the RI/FS Guidance") and other applicable EPA guidance cited herein. If the EPA approves a schedule for any work pursuant to the AOC, the schedule shall supersede any timing requirements established in the RI/FS guidance or other guidance. Likewise, if the EPA, pursuant to the AOC, requires the Respondents to perform certain work at a point in time which is not consistent with the RI/FS guidance or other guidance, the Respondents shall perform the work as specified by the AOC. For example, on page B-2, the RI/FS guidance says that the Field Investigation is complete when the contractors or subcontractors are demobilized from the field; however, if the EPA, pursuant to the AOC, requires the Respondents to perform additional field investigation activities once the contractors or subcontractors have demobilized, the Respondents shall remobilize the contractors or subcontractors and perform the additional work~~. Except where it is inconsistent with this AOC, as determined by the EPA, the RI/FS guidance and the other EPA guidance cited herein are Performance Standards.~~

III. ROLE OF THE EPA

17. The EPA's approval of deliverables, including, but not limited to, submissions, is administrative in nature and allows the Respondents to proceed to the next steps in implementing the work of the RI/FS. The EPA's approval does not imply any warranty of performance, that the RI/FS, when completed, will meet Performance Standards, or that the RI/FS will function properly and be ultimately accepted by the EPA. The EPA retains the right to disapprove submissions during the RI/FS. The EPA may disapprove deliverables including, but not limited to, submissions concerning such matters as the contractor selection, plans and specifications, work plans, processes, sampling, analysis and any other deliverables within the context of the AOC. If a submission is unacceptable to the EPA, the EPA may require the Respondents to make modifications in the submission, and the EPA may require the Respondents to do additional work to support those modifications. That is, if a submission reports certain work that is unacceptable to the EPA, the EPA may require the Respondents to modify the submission text and to perform the work until it is acceptable to the EPA. The Respondents shall modify the submission and perform the work as required by the EPA.

IV. RESPONDENTS' KEY PERSONNEL

Respondents' Project Coordinator

18. When necessary, as determined by the EPA, the EPA will meet with the Respondents and discuss the performance and capabilities of the Respondents' Project Coordinator. When the Project Coordinator's performance is not satisfactory, as determined by the EPA, the Respondents shall take action, as requested by the EPA, to correct the deficiency. If, at any time, the EPA determines that the Project Coordinator is unacceptable for any reason, the Respondents, at the EPA's request, shall bar the Project Coordinator from any work under the AOC and give notice of the Respondents' selected new Project Coordinator to the EPA.

V. TASKS TO BE PERFORMED AND DELIVERABLES

Conduct of the Remedial Investigation/Feasibility Study

19. This SOW specifies the Work to be performed and the deliverables which shall be produced by the Respondent. The Respondent shall conduct the RI/FS in accordance with this SOW, AOC, and all applicable guidance that the EPA uses in conducting RI/FS projects under CERCLA, as well as any additional requirements in the AOC. The Respondents shall furnish all personnel, materials, and services necessary for, and incidental to, performance of the RI/FS, except as otherwise specified in the AOC or SOW.

Submittal of Deliverables

20. All draft and final deliverables specified in this SOW shall be provided in hard copy, by the Respondents, to the EPA (three copies), EPA's RI/FS Oversight Contractor (one copy), Texas Commission on Environmental Quality (TCEQ, one copy), and the Natural Resource Trustees[1] (one copy each). Draft and Final deliverables shall be provided in electronic format (specifically, WordPerfect® Version 9.0 [or higher] for Windows™ and Adobe® PDF format [only final deliverables]) to the EPA. Final deliverables shall be provided in hard copy and electronic format (specifically, Adobe® PDF format) to the Information Repository(ies) established for the Site. Additionally, all deliverables specified in this SOW shall be submitted by the Respondent according to the requirements of this SOW and Appendix B-1 (Schedule of Deliverables/Meetings).

[1]The Natural Resource Trustees for the Site have been preliminarily identified as the U.S. Department of the Interior, U.S. Fish and Wildlife Service, United States Geological Survey, Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, and Texas General Land Office.

21. All deliverables shall be developed in accordance with applicable sections of the potential guidance documents listed in Appendix B-2[2] (Potential Guidance Documents) to this SOW. If the EPA disapproves of or requires revisions to any of these deliverables, in whole or in part, the Respondents shall submit to the EPA revised plans which are responsive to such directions or comments.

Tasks to be Performed by the Respondents

22. The Respondents shall perform each of the following Tasks (Tasks 1-10) as specified in this SOW. These Tasks shall be developed in accordance with applicable sections of the potential guidance documents listed in Appendix B-2 (Potential Guidance Documents) to this SOW and any additional guidance applicable to the RI/FS process.

Task 1: Project Planning

23. The purpose of Task 1 (Project Planning) is to determine how the RI/FS will be managed and controlled. The following activities shall be performed by the Respondents as part of Task 1:

a. Attend Scoping Phase Meeting - The Respondents shall contact the EPA's Remedial Project Manager after the Effective Date of the AOC to schedule a scoping phase meeting. The ***Scoping Phase Meeting*** shall occur within **fifteenone hundred ninety-five (15195) calendar days** after the Effective Date of the AOC. [COMMENT: The expanded time frame from the effective date of the AOC to the scoping phase meeting is requested to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.] The scoping phase meeting may include, but not be limited to, a discussion of the following:

(i) The proposed scope of the project and the specific investigative and analytical activities that will be required;
(ii) Whether there is a need to conduct limited sampling to adequately scope the project and develop project plans;
(iii) Preliminary remedial action objectives;
(iv) Potential remedial technologies and the need for or usefulness of treatability studies;

[2]Appendix B-2 of this SOW does not include all guidance documents that are applicable to the RI/FS for the Site. The Respondent should consult with EPA's Remedial Project Manager for additional guidance and to ensure that these guidance documents have not been superseded.

(v) Potential ARARs associated with the location and contaminants of the Site and the potential response actions being contemplated; and

(vi) Whether a temporary Site office should be set up to support Site work.

b. Evaluate Existing Information - The Respondents shall compile and review all existing Site data. The Respondents shall refer to Table 2-1 (Data Collection Information Sources) of the RI/FS Guidance for a list of possible data collection information sources, and the Respondents shall exhaust all of those applicable sources in compiling the data.

(i) The Respondents shall compile all existing information describing hazardous substance sources, migration pathways, and potential human and environmental receptors. The Respondents shall compile all existing data relating to the varieties and quantities of hazardous substances released on and near the Site. The Respondents shall compile and review all available data relating to past disposal practices of any kind on and near the Site. The Respondents shall compile existing data concerning the physical and chemical characteristics of the hazardous substances, and their distribution among the environmental media (ground water, soil, surface water, sediments, and air) on and near the Site.

(ii) The Respondents shall compile existing data which resulted from any previous sampling events that may have been conducted on and near the Site. The Respondents shall gather existing data which describe previous responses that have been conducted on and near the Site by local, state, federal, or private parties.

(iii) The Respondents shall gather existing information regarding physiography, geology, hydrogeology, hydrology, meteorology, and ecology of the Site.

(iv) The Respondents shall gather existing data regarding background ground water, background soil, background surface water, background sediments, and background air characteristics.

(v) The Respondents shall gather existing data regarding demographics and land use.

(vi) The Respondents shall gather existing data which identify and locate residential, municipal, or industrial wells on and near the Site. The Respondents shall gather existing data which identify surface water uses

for areas surrounding the Site including, but not limited to, downstream of the Site.

(vii) The Respondents shall gather existing information describing the flora and fauna of the Site. The Respondents shall gather existing data regarding threatened, endangered, or rare species, sensitive environmental areas, or critical habitats on and near the Site. The Respondent shall compile existing results from any previous biological testing to document any known ecological effect such as acute or chronic toxicity or bioaccumulation in the food chain.

(viii) The Respondents shall use data compiled and reviewed to describe additional data needed to characterize the Site, to better define potential applicable or relevant and appropriate requirements (ARARs), and to develop a range of preliminarily identified remedial alternatives.

Task 2: Remedial Investigation and Feasibility Study Work Plan

24. The Respondents shall prepare and submit a ***Draft RI/FS Work Plan*** within ~~**sixty**~~**one two hundred forty (~~60~~240) calender days** after the Effective Date of the AOC. [COMMENT: The expanded time frame from the effective date of the AOC to the submittal of the Draft RI/FS Work Plan is requested to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.]

25. The Respondents shall prepare and submit to the EPA a ***Final RI/FS Work Plan*** within ~~**twenthirty (20**~~**30) calendar days** after the receipt of the EPA's comments on the Draft Work Plan that is responsive to the directions in EPA's comments.

26. The Respondents shall use information from appropriate EPA guidance and technical direction provided by the EPA's Remedial Project Manager as the basis for preparing the RI/FS Work Plan.

27. The Respondents shall develop the Draft RI/FS Work Plan (WP) in conjunction with the Draft RI/FS Sampling and Analysis Plan (Task 3, RI/FS Sampling and Analysis Plan) and the Draft RI/FS Site Health and Safety Plan (Task 4, RI/FS Site Health and Safety Plan), although each plan may be submitted to the EPA under separate cover. The Draft RI/FS WP shall include a comprehensive description of the Work to be performed, the methodologies to be utilized, and a corresponding schedule for completion. In addition, the Draft RI/FS WP shall include the rationale for performing the required activities.

28. Specifically, the Draft RI/FS WP shall present a statement of the problem(s) and potential problem(s) posed by the Site and the objectives of the RI/FS. Furthermore, the Draft RI/FS WP shall include a Site background summary setting forth the Site description which includes the geographic location of the Site, and to the extent possible, a description of the Site's physiography, hydrology, geology, and demographics; the Site's ecological, cultural and natural resource features; a synopsis of the Site history and a description of previous responses that have been conducted at the Site by local, state, federal, or private parties; and a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the Site. In addition, the Draft RI/FS WP shall include a description of the site management strategy developed during scoping, and a preliminary identification of remedial alternatives and data needs for evaluation of remedial alternatives. The Draft RI/FS WP shall reflect coordination with treatability study requirements (Task 8, Treatability Studies), to the extent treatability testing is required, and will show a process for and manner of identifying Federal and State chemical, location, and action-specific ARARs.

29. The Draft RI/FS WP shall include a Preliminary Conceptual Site Model (CSM). The CSM is a representation of the site that documents current site conditions. The intent of the CSM is to provide input into the Sampling and Analysis Plans. It identifies possible source areas and affected media, characterizes the distribution of contaminant concentrations across the site, and identifies all potential exposure pathways, migration routes, and potential receptors. The CSM identifies the anticipated future land use, potential ground water use, and is initially developed from existing site data. The CSM is a key component of the RI/FS and shall be revised as new Site investigations produce updated or more accurate information. Specifically, the CSM will be used to: (1) identify data needs that will be targeted during the RI/FS; (2) identify exposure pathways or contaminates for which current data ~~is~~are useable in terms of quality and quantity, to quantify exposures and assess risk; and (3) develop a preliminary list of potential contaminants of concern.

30. Finally, the major part of the Draft RI/FS WP shall be a detailed description of the Tasks (Tasks 1-10) to be performed, information needed for each Task and for the Baseline Risk Assessments, information to be produced during and at the conclusion of each Task, and a description of the Work products and deliverables that the Respondents will submit to the EPA. This includes the deliverables set forth in the remainder of this SOW; a schedule for each of the required activities which is consistent with this SOW; a project management plan, including a data management plan (e.g., requirements for project management systems and software, minimum data requirements, data format and backup data management) and monthly reports to the EPA; and meetings and presentations to the EPA at the conclusion of each major phase of the RI/FS. The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial

Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the suggested RI/FS WP format and ~~the required~~ content.

31. The Respondents are responsible for fulfilling additional data and analysis needs identified by the EPA consistent with the general scope and objectives of this RI/FS. Because of the nature of the Site and the iterative nature of the RI/FS, additional data requirements and analyses may be identified throughout the process. If any significant additional Work is required to meet the objectives stated in the RI/FS WP, based upon new information obtained during the RI/FS, the Respondents shall submit a Draft RI/FS WP Amendment to the EPA for review and approval prior to any additional Work being conducted in accordance with the AOC and SOW. The EPA may, at its discretion, give verbal approval for Work to be conducted prior to providing written approval of the Draft RI/FS WP Amendment.

Task 3: RI/FS Sampling and Analysis Plan

32. The Respondents shall prepare a ***Draft RI/FS Sampling and Analysis Plan (SAP)*** within **~~sixty~~two hundred forty (~~60~~240) calendar days** after the Effective Date of the AOC. [COMMENT: The expanded time frame from the effective date of the AOC to the submittal of the Draft RI/FS SAP is requested to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.]

33. The Respondents shall prepare and submit to the EPA a ***Final RI/FS Sampling and Analysis Plan (SAP)*** within **~~twenty~~thirty (~~20~~30) calendar days** after the receipt of the EPA's comments on the draft plan that is responsive to the directions in EPA's comments.

34. The Draft RI/FS SAP shall provide a mechanism for planning field activities and shall consist of an RI/FS Field Sampling Plan and Quality Assurance Project Plan as follows:

    a. RI/FS Field Sampling Plan (FSP)- The RI/FS FSP shall define in detail the sampling and data gathering methods that will be used for the project to define the nature and extent of contamination and ecological risk assessment-related studies (Task 7, Risk Assessments). It shall include, but not be limited to, sampling objectives, sample rational, location and frequency, sampling equipment and procedures, and sample handling and analysis. The RI/FS FSP shall contain a completed Sample Design Collection Worksheet and a Method Selection Worksheet. These worksheet templates can be found in the EPA's guidance document titled "Guidance for Data Useability in Risk Assessment" (EPA 1992a). ~~In addition, the FSP shall include a comprehensive description of the Site~~

~~including geology, location, and physiographic, hydrological, ecological, cultural, and natural resource features of the Site, a brief synopses of the history of the Site, summary of existing data, and information on fate and transport and effects of chemicals. As such, the~~The Respondents shall provide a strategy that ~~includes both biased sampling and random sampling~~meets the identified data quality objectives. The human health and ecological risk assessments require that the sampling be conducted to demonstrate that the data are statistically representative of the Site. The Respondents shall also confirm that the detection limits for all laboratories are in accordance within the goals stated in the EPA's risk assessment guidance. The FSP shall consider the use of all existing data and shall justify the need for additional data whenever existing data will meet the same objective. The FSP shall be written so that a field sampling team unfamiliar with the Site would be able to gather the samples and field information required. The Respondents shall refer to EPA's guidance documents titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the suggested RI/FS FSP format and ~~the required~~ content.

b. RI/FS Quality Assurance Project Plan (QAPP) - The RI/FS QAPP shall describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that will be used to achieve the desired Data Quality Objectives (DQOs). The DQOs shall at a minimum reflect use of analytical methods for identifying contamination and remediating contamination consistent with the levels for remedial action objectives identified in the NCP. In addition, the RI/FS QAPP shall address sampling procedures, sample custody, analytical procedures, data reduction, data validation, data reporting, and personnel qualifications. The Respondents shall refer to EPA's guidance documents titled "EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5" (EPA 1998b) and "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5" (EPA 2001), which describes the suggested RI/FS QAPP format and ~~the required~~ content.

35. The Respondents shall demonstrate in advance, to the EPA's satisfaction, that each analytical laboratory it may use is qualified to conduct the proposed Work. This includes use of methods and analytical protocols for the chemicals of concern in the media of interest within detection and quantification limits consistent with both QA/QC procedures and the DQOs approved in the RI/FS QAPP for the Site by the EPA. The laboratory must have, and follow, an approved QA program. If a laboratory not in the Contract Laboratory Program (CLP) is selected, methods consistent with CLP methods shall be used where appropriate. Any methods not consistent with CLP methods shall be approved by EPA prior to their use. Furthermore, if a laboratory not in the CLP program is selected, a laboratory QA program must be submitted to the EPA for review and

approval. The EPA may require the Respondents to submit detailed information to demonstrate that the laboratory is qualified to conduct the Work, including information on personnel and qualifications, equipment, and material specifications.

Task 4: RI/FS Site Health and Safety Plan

36. The Respondents shall prepare and submit to the EPA an ***RI/FS Site Health and Safety Plan (HSP)*** within **~~twenty~~two hundred forty (~~20~~240) calendar days** after the Effective Date of this AOC. [COMMENT: The expanded time frame from the effective date of the AOC to the submittal of the RI/FS HSP is requested to allow EPA and the Respondents an approximately six-month period to focus their resources on the AOC and SOW development, action memorandum preparation, planning, and initiation of removal action activities at the Site prior to the commencement of RI/FS activities.]

37. A HSP that is in compliance with Occupational Safety and Health Administration and EPA requirements must be in place prior to any onsite activities. The EPA will review, but not approve, the RI/FS Site HSP. In addition, EPA may require a revised RI/FS Site HSP to be submitted for review in the event that the RI/FS WP is changed or amended (e.g., such as in the performance of pilot studies which may result in the airborne emissions of hazardous substances from the Site). The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the suggested RI/FS Site HSP format and ~~the required~~ content.

Task 5: Community Relations Plan

38. The development and implementation of community relations activities, including conducting community interviews and developing a community relations plan, are the responsibilities of EPA. Respondents must assist as required by EPA by providing information regarding the Site's history, preparing meeting visual aids as required, participating in public meetings, dissemination of news releases, and/or by preparing fact sheets for distribution to the general public. In addition, EPA may require that Respondents establish a community information repository at or near the Site to house one copy of the administrative record. The extent of Respondents' involvement in community relations activities is left to the discretion of EPA. Respondents' community relations responsibilities, if any, are specified in the community relations plan. All community relations activities will be subject to oversight by EPA.

39. The Respondents shall make arrangements for public meetings and workshops as directed by EPA, including, but not limited to, the selection and reservation of a meeting space, and providing the necessary audio-visual equipment including screens, overhead projectors, and computer projectors.

40. The Respondents shall reserve a court reporter for public meetings regarding the Proposed Plan. A full page original and a 3.5 inch computer disk in Word Perfect format, or a CD, of the transcripts shall be provided to EPA (three copies), with additional copies provided to the State and the Site information repository.

Task 6: Site Characterization

41. As part of the Remedial Investigation (RI), the Respondents shall perform the activities described in this Task, including the preparation of a ~~Preliminary Site Characterization Report and a~~ RI Report (Task 9, Remedial Investigation Report). The overall objective of the Site's characterization will be to describe areas of the Site that may pose a threat to human health or the environment. This will be accomplished by first determining the Site's physiography, geology, and hydrology. Surface and subsurface pathways of migration shall be defined by the Respondents. The Respondents shall identify the sources of contamination and define the nature, extent, and volume of the sources of contamination, including their physical and chemical constituents. The Respondents shall also investigate the extent of migration of this contamination as well as its volume and any changes in its physical or chemical characteristics, to provide for a comprehensive understanding of the nature and extent of contamination at the Site. Using this information, Respondents will then determine and project the contaminant fate and transport.

42. The Respondents shall implement the Final RI/FS WP, and SAP during this phase of the RI/FS. Field data will be collected and analyzed to provide the information required to accomplish the objectives of the study. The Respondents shall notify the EPA at least **~~fifteen~~ (15~~0~~) calendar days** in advance of the field work regarding the planned dates for field activities, potentially including, but not limited to, ecological field surveys, field layout of the sampling grid, installation of wells, initiating sampling (air, surface water, ground water, sediments, soils, sludges, and biota), installation and calibration of equipment, aquifer tests, and initiation of analysis and other field investigation activities (including geophysical surveys and borehole geophysics). The Respondents shall demonstrate that the laboratory and type of laboratory analyses that will be utilized during the Site's characterization meets the specific QA/QC requirements and the DQOs of the investigation of the Site as specified in the Final RI/FS SAP. Activities are often iterative, and to satisfy the objectives of the RI/FS, it may be necessary for the Respondents to supplement the Work specified in the Final RI/FS WP.

43. The Respondents shall perform the following activities as part of Task 6 (Site Characterization):

a. Field Investigation - The field investigation shall include the gathering of data to define the Site's physical and biological characteristics, sources of contamination, and the nature, extent, fate, and transport of contamination at the Site. These activities shall be performed by the Respondents in accordance with the Final RI/FS WP and SAP. At ~~a minimum~~s appropriate, this field investigation ~~shall~~may address the following:

(i) Implementation and Documentation of Field Support Activities - The Respondents shall initiate field support activities following the Final RI/FS WP and SAP approval by the EPA. Field support activities may include obtaining access to the Site, scheduling, and procurement of equipment, office space, laboratory services, and/or contractors.

(ii) Investigation and Definition of Site Physical and Biological Characteristics - The Respondents shall collect data on the physical and biological characteristics of the Site and its surrounding areas including the physiography, geology, hydrology, and specific physical characteristics. This information shall be ascertained through a combination of physical measurements, observations, and sampling efforts, and will be utilized to define potential transport pathways and human and ecological receptor populations (including risks to endangered or threatened species). In defining the Site's physical characteristics, the Respondents ~~shall~~may also obtain sufficient engineering data for the projection of contaminant fate and transport and development and screening of remedial action alternatives, including information to assess treatment technologies, as necessary.

(iii) Surveying and Mapping of the Site - The Respondents shall develop a map of the Site that includes topographic information and physical features on and near the Site. If no detailed topographic map for the Site exists, a survey of the Site shall be conducted, as needed.

(iv) Existing Well Inventory and Survey - The Respondents shall inventory and survey existing monitoring, residential, water supply, and industrial wells located within one mile of the Site. At ~~a minimum~~s available, the well information provided shall include the location, elevation, construction details including total depth and screened interval, aquifer name, use, and lithology (as determined from available well drilling records).

(v) Waste Characterization - The Respondents shall determine the location, type, and quantities as well as the physical or chemical characteristics of

any waste remaining at the Site after the surface removal action has been completed. If hazardous substances are held in containment vessels, the integrity of the containment structure and the characteristics of the contents shall be determined, to the extent such information is necessary to assess potential risks at the Site and facilitate the development and screening of remedial action alternatives.

(vi) Definition of Sources of Contamination - The Respondents shall locate each source of contamination. ~~For each location, the areal extent and depth of contamination will be determined by sampling at incremental depths on a sampling grid.~~ The physical characteristics and chemical constituents and their concentrations will be determined for all known and discovered sources of contamination. The Respondents shall conduct sufficient sampling to define the boundaries of the contaminant sources to the level established in the Final RI/FS QAPP and DQOs. Defining the source of contamination ~~shall~~may include analyzing the potential for contaminant release (e.g., long-term leaching from soil), contaminant mobility and persistence, and characteristics important for evaluating remedial actions, including information to assess treatment technologies as necessary.

(vii) Description of the Nature and Extent of Contamination - The Respondent shall gather information to describe the nature and extent of contamination as a final step during the field investigation. This information ~~shall~~may also include soil contaminant retention capacity and mechanisms, ground water recharge and discharge areas, and ground water flow direction and rate at the Site. To describe the nature and extent of contamination, the Respondents shall implement an iterative sampling and monitoring program, and any study program identified in the Final RI/FS WP or SAP, such that by using analytical techniques sufficient to detect and quantify the horizontal and vertical concentration profiles of any potential contaminants, including any degradation or daughter contaminants, the migration of contaminants through the various media at the Site can be determined.

(viii) In addition, the Respondents shall gather data for calculations of contaminant fate and transport, if appropriate.

(ix) This process shall be continued until the area and depth of contamination are known, based on validated data, to the level of contamination established in the Final RI/FS QAPP and DQOs. The Respondents shall describe the factors influencing contaminant movement and prepare an

extrapolation of future contaminant movement, if necessary. The information on the nature and extent of contamination will be used to determine the level of risk presented by the Site and to help determine aspects of the appropriate remedial action alternatives to be evaluated.

b. Data Analyses - The Respondents shall analyze the data collected and refine the Conceptual Site Model by presenting and analyzing validated data on source characteristics, the nature and extent of contamination, the transport pathways and fate of the contaminants present at the Site, and the effects on human health and the environment:

(i) Evaluation of Site Characteristics - The Respondent shall analyze and evaluate the data to describe the Site's physical and biological characteristics, contaminant source characteristics, nature and extent of contamination, and contaminant fate and transport. Results of the Site's physical characteristics, source characteristics, and extent of contamination analyses are utilized in the analysis of contaminant fate and transport. The evaluation will include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as the mobility and persistence of the contaminants. Where modeling is appropriate, such models shall be identified by the Respondents to the EPA in a ***Technical Memorandum on Modeling of Site Characteristics*** prior to their use. If EPA disapproves of or requires revisions to the technical memorandum, in whole or in part, Respondents shall amend and submit to EPA a revised technical memorandum on modeling which is responsive to directions and EPA comments within ~~fifteen~~thirty **(~~15~~30) calendar days** of receipt of EPA's comments.

All data and programming, including any proprietary programs, shall be made available to the EPA together with a sensitivity analysis. The RI data shall be presented in a format to facilitate the Respondents' preparation of the Baseline Human Health and Ecological Risk Assessments (Task 7, Risk Assessments). All data shall be archived in ~~a database in a~~ such a format that would be accessible to investigators as needed.

The Respondents shall agree to discuss and then collect information as necessary to address any data gaps identified by the EPA ~~that are needed to complete~~consistent with the ~~risk assessments~~DQO process. Also, this evaluation shall provide any information relevant to the Site's characteristics necessary for evaluation of the need for remedial action in the risk assessments and for the development and evaluation of remedial

alternatives. Analyses of data collected for the Site's characterization shall meet the DQOs developed in the Final RI/FS QAPP and stated in the Final RI/FS SAP (or revised during the RI).

c. Data Management Procedures - The Respondents shall consistently document the quality and validity of field and laboratory data compiled during the RI as follows:

(i) Documentation of Field Activities - Information gathered during the Site's characterization shall be consistently documented and adequately recorded by the Respondents in well maintained field logs and laboratory reports. The method(s) of documentation shall be specified in the Final RI/FS WP and/or the SAP. Field logs shall be utilized to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports shall document sample custody, analytical responsibility and results, adherence to prescribed protocols, non-conformity events, corrective measures, and data deficiencies.

(ii) Sample Management and Tracking - The Respondents shall maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported and utilized in the risk assessments and the development and evaluation of remedial alternatives. Analytical results developed under the Final RI/FS WP shall not be included in any characterization reports of the Site unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the Respondent shall establish a data security system to safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

~~d. Site Characterization Deliverables - The Respondent shall prepare the Preliminary Site Characterization Summary Report as follows:~~

~~(i) The Respondents shall submit a ***Draft Preliminary Site Characterization (PSC) Report*** to EPA for review and approval within **thirty (30) calendar days** following receipt of all validated sample analytical results from the laboratory.~~

~~(ii) The Respondents shall submit to the EPA the ***Final Preliminary Site Characterization (PSC) Report*** that is responsive to the directions in EPA's comments within **twenty (20) calendar days** from the receipt of the EPA's comments on the draft report.~~

~~(iii) The PSC Report shall describe the investigative activities that have taken place, and describe and display the Site's data documenting the location and characteristics of surface and subsurface features and contamination at the Site including the affected medium, location, types, physical state, and concentration and quantity of contaminants. In addition, the location, dimensions, physical condition, and varying concentrations of each contaminant throughout each source, and the extent of contaminant migration through each of the affected media shall be documented.~~

~~The Draft PSC Report shall provide the EPA and the Respondent with a preliminary reference for developing the Baseline Human Health and Ecological Risk Assessments, evaluating the development and screening of remedial alternatives, and the refinement and identification of ARARs.~~

Task 7: Risk Assessments

44. The Respondents shall perform a Baseline Human Health Risk Assessment (BHHRA), Screening Level Ecological Risk Assessment, and a Baseline Ecological Risk Assessment (if necessary) for the Site. The Respondent will prepare one section of the Final RI/FS WP (Task 2) which discusses the risk assessment process and outlines the steps necessary for coordinating with the EPA at key decision points within the process. Submittal of deliverables, meetings and/or conference calls, and presentations to the EPA will be reflected in the project schedule in the Final RI/FS WP to demonstrate the progress made on the risk assessments. The DQOs listed within the Final RI/FS QAPP will include DQOs specific to risk assessment needs, and critical samples needed for the risk assessments will be so identified within the Final RI/FS SAP. These risk assessments shall consist of both Human Health and Ecological Risk Assessments as follows:

a. Baseline Human Health Risk Assessment - The Respondents shall perform a BHHRA to evaluate and assess the risk to human health posed by the contaminants present at the Site. The Respondent shall refer to the appropriate EPA guidance documents (EPA 1989b, 1991a, 1991b, 1991c, 1992a, and 1998a) in conducting the BHHRA. The Respondents shall address the following in the BHHRA:

(i) Hazard Identification (sources)/Dose-Response Assessment - ~~After completion~~During performance of ~~the Preliminary Site C~~site characterization ~~Report~~activities, the Respondents shall review available information on the hazardous substances present at the Site and identify the major contaminants of concern. The Respondents, with concurrence from the EPA, shall select

contaminants of concern based on their intrinsic toxicological properties.

(ii) ~~No later than **twenty (20) calendar days** following receipt of EPA approval of the Final PSC Report, the~~ Respondents shall ~~submit to EPA for review and approval a ***Draft Potential Chemicals of Concern (PCOC) Memorandum*** listing~~include in the BHHRA Report a list of hazardous substances present at the Site (i.e., chemicals of concern as described in the Risk Assessment Guidance for Superfund).

~~(iii) The Respondents shall submit to the EPA the ***Final Potential Chemicals of Concern (PCOC) Memorandum*** that is responsive to the directions in EPA's comments within **seven (7) calendar days** from the receipt of the EPA's comments on the draft memorandum.~~

(iii) Conceptual Exposure/Pathway Analysis - The Respondents shall identify and analyze actual and potential exposure pathways. The proximity of contaminants to exposure pathways and their potential to migrate into critical exposure pathways shall be assessed.

(iv) Characterization of Site and Potential Receptors - The Respondents shall identify and characterize human populations in the exposure pathways.

~~(vi) No later than **thirty (30) calendar days** following receipt of EPA approval of the Final PSC Report, the Respondents shall submit a ***Draft Exposure Assessment Memorandum*** to EPA for review and approval.~~

~~(vii) The Respondents shall submit a ***Final Exposure Assessment Memorandum*** that is responsive to the directions in EPA's comments within **fifteen (15) calendar days** of receipt of the EPA's comments on the draft memorandum.~~

(v) During the exposure assessment, the Respondents shall identify the magnitude of actual or potential human exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment shall include an evaluation of the likelihood of such exposures occurring and shall provide the

basis for the development of acceptable exposure levels. In developing the exposure assessment, the Respondents shall develop reasonable maximum estimates of exposure for both current land use conditions and potential future land use conditions at the Site. The ~~Exposure Assessment memorandum~~BHHRA Report shall describe the exposure scenarios, assumptions, fate and transport models, and data.

(vi) Risk Characterization - During risk characterization, the Respondents shall compare chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment, to measured levels of contaminant exposure levels and the levels predicted through environmental fate and transport modeling. These comparisons shall determine whether concentrations of contaminants at or near the Site are affecting or could potentially affect human health.

For chemicals lacking an EPA toxicity value, Respondents shall ~~submit to EPA for review and approval a ***Draft Toxicological and Epidemiological Studies Memorandum*** which will list of the toxicological and epidemiological studies that will be used to perform the toxicity assessment. If EPA disapproves of or requires revisions to the toxicological and epidemiological studies memorandum, in whole or in part, Respondents shall amend and submit to EPA a ***Final Toxicological and Epidemiological Studies Memorandum*** which is responsive to the directions in all EPA comments **within fifteen (15) calendar days** of receiving EPA's comments~~work with EPA to identify an appropriate surrogate toxicity factor or other means to evaluate risk.

(vii) Identification of Limitations/Uncertainties - The Respondents shall identify critical assumptions (e.g., background concentrations and conditions) and uncertainties in the BHHRA.

(viii) Conceptual Site Model - Based on contaminant identification, exposure assessment, toxicity assessment, and risk characterization, the Respondents shall update the Conceptual Site Model for the Site.

b. No later than **th~~ir~~nety (~~30~~90) calender days** following receipt of EPA approval of the Final ~~Exposure Assessment Memorandum~~RI Report, the Respondents shall prepare and submit to the EPA for review and approval a ***Draft Baseline Human Health Risk Assessment (BHHRA) Report***.

c. The Respondents shall submit a ***Final Baseline Human Health Risk Assessment (BHHRA) Report*** that is responsive to the directions in EPA's comments within ~~twenty~~thirty (~~20~~30) **calendar days** of receipt of the EPA's comments on the draft report.

d. The Respondents shall prepare and submit an Ecological Risk Assessment (ERA) Report that ~~conforms to~~is consistent with applicable guidance from Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments, (U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997) and other current EPA guidance, including but not limited to EPA 1989b, EPA 1992a, EPA 1992b, and EPA 1993. The scoping of all phases of the ERA shall follow the general approach provided in applicable sections of EPA 1992b and shall include discussions between the Respondents' and the EPA's risk assessors and risk managers.

The Baseline Ecological Risk Assessment process will be identified and discussed as part of the RI/FS WP. Using existing data, a preliminary ecological Conceptual Site Model will be developed in the RI/FS WP to identify data needs. The necessary data will be collected as part of the RI and these data will be used in the Baseline Ecological Risk Assessment (BERA).

The eight steps in the Baseline Ecological Risk Assessment (BERA) process include: Step 1 - Screening-Level Problem Formulation and Ecological Effects Evaluation, Step 2 - Screening-Level Preliminary Exposure Estimate and Risk Calculation, and submittal of a Screening Level Ecological Risk Assessment (SLERA) Report, and continues with, if necessary, Step 3 - Baseline Risk Assessment Problem Formulation, Step 4 - Study Design and Data Quality Objectives, and submittal of a ecological risk assessment work plan ~~included with the RI/FS Sampling and Analysis Plan~~, Step 5 - Field Verification and Sampling Design, Step 6 - Site Investigation and Analysis of Exposure and Effects, Step 7 - Risk Characterization and submittal of the Baseline Ecological Risk Assessment (BERA) Report, and Step 8 - Risk Management. The Respondents shall perform the BERA in accordance with the applicable sections of appropriate EPA's guidance documents (EPA 1992a, 1997, and 1998a). The Respondents shall interact closely with the EPA's Remedial Project Manager and risk assessment staff assigned to the Site to ensure that draft deliverables are acceptable and major rework is avoided on subsequent submittals. The scope of the BERA will be determined via a phased approach as outlined in the EPA's guidance documents ~~and documented in the following deliverables:~~.

(i) Steps 1~~, Screening Level~~ and 2 (the Screening-Level Problem

Formulation and Ecological Effects Evaluation ~~- The "Screening Level Problem Formulation and Ecological Effects Evaluation" step is part of the initial ecological risk screening assessment. For this initial step, it is likely that site-specific information for determining the nature and extent of contamination and for characterizing ecological receptors at the Site is limited. This step includes all the functions of problem formulation (Steps 3 and 4) and ecological effects analysis, but on a screening level. The results of this step will be used in conjunction with exposure estimates during the preliminary risk calculation in Step 2 (~~and Screening-Level Preliminary Exposure Estimate and Risk Calculation)~~.~~

~~(ii) For the screening level problem formulation, the Respondents shall develop a Conceptual Site Model that addresses these five issues: 1) environmental setting and contaminants known or suspected to exist at the Site, 2) contaminant fate and transport mechanisms that might exist at the Site, 3) the mechanisms of ecotoxicity associated with contaminants and likely categories of receptors that could be affected, 4) the complete exposure pathways that might exist at the Site, and 5) selection of endpoints to screen for ecological risk.~~

~~(iii) The next step in the initial~~. The deliverable for these steps will be a ***Draft Screening Level Ecological Risk Assessment (SLERA) Report***, which will be submitted to EPA for review and approval within **ninety (90) calendar days** following approval of the Final RI Report. The SLERA will use site data with ecotoxicity screening criteria to estimate potential ecological ~~risk screening assessment will be the preliminary ecological effects evaluation and the establishment of contaminant exposure levels that represent conservative thresholds for adverse ecological effects. Screening ecotoxicity values shall represent a no-observed-adverse-effect-level for long-term exposures to a contaminant. Ecological effects of most concern are those that can impact populations (or higher levels of biological organizations) and include adverse effects on development, reproduction, and survivorship. For some of the data reported in the literature, conversions may be necessary to allow the data to be used for measures of exposure other than those reported~~risks and identify any bio-accumulative contaminants present at the Site using Table 3-1 of Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas (TCEQ), December 2001. The Respondents shall ~~consult with the EPA's Remedial Project Manager and risk assessors concerning any extrapolations used in developing screening ecotoxicity values.~~

~~(iv) Step 2, Screening-Level Exposure Estimate and Risk Calculation - The~~

~~ecological effects at the Site. Existing and potential exposure concentrations shall be calculated based on the 95% upper confidence level (UCL) of the mean media concentration, and not the average values. This analysis will be based on the information collected during Steps 1 through 5 and will include additional assumptions or models to interpret the data in the context of the CSM. Changing field conditions and new information on the nature and extent of contamination may require a change to the RI/FS Sampling and analysis Plan.~~

~~(xvii) Step 7 - Risk Characterization - The "Risk Characterization" step is considered the final phase of the BERA process and will include two major components: risk estimation and risk description. Risk estimation is based on the Site investigation results and will consist of integrating the exposure profiles with the exposure-effects information and summarizing the associated uncertainties. The risk description will provide information important for interpreting the risk results and will identify a threshold for adverse effects on the assessment endpoints.~~

~~(xviii) No later than **sixty (60) calender days** following receipt of EPA approval of the Final PSC Report, the Respondents shall submit to EPA for review and approval a ***Draft Baseline Ecological Risk Assessment (BERA) Report.***~~

~~(xix) The Respondents shall submit a Final ***Baseline Ecological Risk Assessment (BERA) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of the EPA's comments on the draft report.~~

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(iv) Step 8 - Risk Management - "Risk Management" at the Site will be the responsibility of the EPA's Remedial Project Manager, who must balance risk reductions associated with cleanup of contaminants with potential impacts of the remedial actions themselves. In Step 7, a threshold for effects on the assessment endpoint as a range between contamination levels identified as posing no ecological risk and the lowest contamination levels identified as likely to produce adverse ecological effects will be identified. In Step 8, the EPA's Remedial Project Manager will evaluate several factors in deciding whether or not to clean up to within that range. This risk management decision will be finalized by the EPA in the Record of Decision for the Site.

Task 8: Treatability Studies

45. Treatability testing shall be performed, if required by EPA, by the Respondents to assist in the detailed analysis of alternatives. In addition, if applicable, testing results and operating conditions shall be used in the detailed design of the selected remedial technology. The following activities shall be performed by the Respondents:

a. Determination of Candidate Technologies and of the Need for Testing - The Respondents shall identify the candidate technologies for a treatability studies program. Treatability studies may consist of laboratory screening, bench-scale testing, and/or pilot-scale testing. The listing of candidate technologies will cover the range of technologies required for alternatives analysis. The specific data requirements for the testing program will be determined and refined during the characterization of the Site and the development and screening of remedial alternatives. The Respondent shall perform the following activities:

(i) ~~Conduct of Literature Survey and~~ Determination of the Need for Treatability Testing ~~- The Respondents shall conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance requirements, and implementability of candidate technologies~~. If practical technologies have not been sufficiently demonstrated or cannot be adequately evaluated for this Site on the basis of available information, treatability testing may need to be conducted. Where it is determined by the EPA that treatability testing is required, and unless the Respondents can demonstrate to the EPA's satisfaction that they are not needed, the Respondents shall be required to submit a Treatability Study Work Plan to the EPA proposing the type(s) of treatability study to be conducted (i.e., laboratory screening, bench-scale testing, and/or pilot-scale testing), and outlining the steps and data necessary to initiate and evaluate the treatability testing program.

(ii) The Respondents shall submit a ***Draft Treatability Study (TS) Work Plan***, which includes a Sampling and Analysis Plan (SAP) and Health and Safety Plan, within **~~th~~sir~~x~~ty (~~30~~60) calendar days** after the receipt of the notice from the EPA that treatability studies are required.

(iii) The Respondents shall submit a ***Final Treatability Study (TS) Work Plan*** that is responsive to the directions in EPA's comments within **~~twen~~thirty (~~20~~30) calendar days** of the receipt of the EPA's comments on the draft work plan.

(iv) The Respondents shall submit a ***Draft Treatability Study (TS) Report*** to the EPA for review and approval according to the project schedule in the Final Treatability Study Work Plan.

(v) The Respondents shall submit a ***Final Treatability Study (TS) Report*** that is responsive to the directions in EPA's comments within ~~**twenthirty (2030)**~~ **calendar days** of the receipt of the EPA's comments on the draft report. This Report shall evaluate the technology's effectiveness and implementability in relation to the Preliminary Remediation Goals established for the Site. Actual results must be compared with predicted results to justify effectiveness and implementability discussions.

Task 9: Remedial Investigation Report

46. No later than ~~**snixnety (6090)**~~ **calendar days** following receipt of ~~EPA approval of the PSC Report~~all validated sample analytical results from the laboratory (except for supplemental ecological sampling data), the Respondents shall prepare and submit a ***Draft Remedial Investigation (RI) Report.***

47. The Respondents shall submit a ***Final Remedial Investigation (RI) Report*** that is responsive to the directions in EPA's comments within ~~**thirty**~~**sixty (~~30~~60) calendar days** of the receipt of the EPA's comments on the draft report.

48. The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) ~~and shall specifically follow Table 3-13 (Suggested RI Report Format) for the RI Report format and the required content~~. The information shall include a summary of the results of the field activities to characterize the Site, classification of ground water beneath the Site, nature and extent of contamination, and appropriate site-specific discussions for fate and transport of contaminants.

49. The Respondents shall conduct a presentation to the EPA within **fifteen (15) calendar days** following submission of the Final RI Report. At this presentation, the Respondents shall present and discuss the findings of the RI, Remedial Action Objectives, candidate technologies and remedy alternatives envisioned for the FS, and the comparative analysis.

Task 10: Feasibility Study

50. The Respondents shall perform a Feasibility Study (FS) as specified in this SOW. The FS shall include, but not be limited to, the development and screening of alternatives for

remedial action, a detailed analysis of alternatives for remedial action, submittal of Draft and Final FS Reports, and other reports/memoranda as follows:

~~51. No later than **thirty (30) calendar days** following receipt of EPA approval of the Final PSC Report, the Respondents shall submit a ***Draft Remedial Alternatives Memorandum*** to the EPA for review and approval.~~

~~52. The Respondents shall submit a ***Final Remedial Alternatives Memorandum*** that is responsive to the directions in EPA's comments within **fifteen (15) calendar days** of the receipt of the EPA's comments on the draft memorandum.~~

~~a. The Respondents shall develop an appropriate range of remedial alternatives that will be evaluated through development and screening. The Remedial Alternatives Memorandum shall summarize the assembled alternatives for each affected medium and the chemical, location, and action-specific ARARs for each of the considered alternatives. The reasons for eliminating alternatives during the preliminary screening process shall be specified.~~

~~b. The Remedial Alternatives Memorandum shall summarize the results of the screening process in relation to the Remedial Action Objectives and the more specific Preliminary Remediation Goals for the Site.~~

51. No later than **~~for~~six~~ty five (~~45~~60) calendar days** after receipt of EPA approval of the Final ~~RI~~BHHRA Report or the Final BERA Report (whichever is later), the Respondents shall submit to EPA for review and approval a ***Draft Feasibility Study (FS) Report.***

~~54. The Respondents shall submit a ***Interim Final Feasibility Study (FS) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of the EPA's comments on the draft report.~~

52. The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b), specifically Table 6-5 (Suggested FS Report Format) for FS Report content and format.

53. The FS Report shall include a detailed analysis of remedial alternatives for the candidate remedies identified during the screening process. This detailed analysis shall follow the applicable sections of EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) and other appropriate guidance documents. The major components of the analysis of alternatives for remedial action shall consist of an analysis of each option against a set of evaluation criteria and a separate discussion for the comparative analysis

of all options with respect to each other in a manner consistent with the NCP. The Respondents shall not consider state and community acceptance during the analysis of alternatives. The EPA will perform the analysis of these two criteria.

54. The nine evaluation criteria used to evaluate the different remediation alternatives individually and against each other in order to select a remedy include the following:

a. Overall protection of human health and the environment;
b. Compliance with ARARs;
c. Long-term effectiveness and permanence;
d. Reduction of toxicity, mobility, or volume;
e. Short-term effectiveness;
f. Implementability;
g. Cost;
h. State acceptance; and
i. Community acceptance.

55. The FS Report shall provide the basis for the Proposed Plan developed by the EPA under CERCLA and shall document the development and analysis of remedial alternatives. The ~~Interim-Final~~Draft FS Report may be subject to change following comments received during the public comment period on the EPA's Proposed Plan. The EPA will forward any comments pertinent to the content of the ~~Interim-Final~~Draft FS Report to the Respondents. The Respondents shall submit a ***Final FS Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of these comments.

APPENDIX B-1

SCHEDULE OF DELIVERABLES/MEETINGS

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
GULFCO MARINE MAINTENANCE SUPERFUND SITE

DELIVERABLES/MEETINGS	DUE DATES (CALENDAR DAYS)
1. ~~Scoping Phase~~Removal Action Consent Order / Statement of Work Development Meeting	Meeting to occur within fifteen (15) days after the Effective Date of the AOC.
~~2~~2. Scoping Phase Meeting	Meeting to occur within one hundred ninety-five (195) days after the Effective Date of the AOC.
3. RI/FS Site Health and Safety Plan	Plan due within ~~twenty~~two hundred forty (~~20~~240) days after the Effective Date of the AOC. Plan must be in place prior to any onsite RI/FS activities.
~~3~~4. Screening Level Ecological Risk Assessment (SLERA) Report	~~Draft due within thirty (30) days after the Effective Date of the AOC. Final due within fifteen (15) days of the receipt of the EPA's comments.4. RI/FS Work PlanDraft due within sixty (60) days after the Effective Date of the AOC. Final due within twenty (20) days after the receipt of the EPA's comments. 5. RI/FS Sampling and Analysis PlanDraft due within sixty (60) days after the Effective Date of the AOC. Final due within twenty (20) days after the receipt of the EPA's comments. 6. Technical Memorandum on Modeling of Site Characteristics.Draft due when Respondents propose that modeling is appropriate. Final due within fifteen (15) days after receipt of the EPA's comments. 7. Preliminary Site Characterization (PSC) ReportDraft due within thirty (30) days after receipt of all validated laboratory data. Final due within twenty (20) days of the receipt of the EPA's comments. 8. Potential Chemicals of Concern (PCOC) Memorandum~~Draft due within ~~twenty~~ninety (~~20~~90) days after receipt of EPA approval of the Final ~~PSC~~RI Report. Final due within ~~seven~~thirty (~~7~~30) days of the receipt of the EPA's comments.
~~4~~5. ~~Exposure Assessment Memorandum~~RI/FS Work Plan	Draft due within ~~thirty~~two hundred forty (~~30~~240) days after ~~receipt~~the Effective Date of ~~EPA approval of Final PSC Report~~the AOC. Final due within ~~fifteen~~thirty (~~15~~30) days ~~of~~after the receipt of the EPA's comments.

DELIVERABLES/MEETINGS	DUE DATES (CALENDAR DAYS)
~~10~~6. ~~Toxicological~~RI/FS Sampling and ~~Epidemiological Studies Memorandum.~~Analysis Plan	Draft due ~~as specified in the Final RI/FS Work Plan~~within two hundred forty (240) days after the Effective Date of the AOC. Final due within ~~fifteen~~thirty (~~15~~30) days ~~of~~after the receipt of the EPA's comments.
7. Technical Memorandum on Modeling of Site Characteristics.	Draft due when Respondents propose that modeling is appropriate. Final due within thirty (30) days after receipt of the EPA's comments.
~~11~~8. Baseline Human Health Risk Assessment Report	Draft due within ~~thirty~~ninety (~~30~~90) days after receipt of EPA approval of Final ~~Exposure Assessment memorandum~~RI Report. Final due within ~~twenty~~thirty (~~20~~30) days of the receipt of the EPA's comments.
~~12~~9. Baseline Ecological Risk Assessment Report	~~D~~If prepared, draft due within ~~sixty~~ninety (~~60~~90) days after ~~receipt~~validation of ~~EPA approval of Final PSC Report~~supplemental ecological sampling data. Final due within thirty (30) days of the receipt of the EPA's comments.
13~~0~~. Treatability Study Work Plan	Draft due within ~~thirty~~sixty (~~30~~60) days of the receipt of EPA's notice that treatability studies are required. Final due within ~~twenty~~thirty (~~20~~30) days of the receipt of the EPA's comments.
14~~1~~. Treatability Study Report	Draft due as specified in the Final Treatability Study Work Plan. Final due within ~~twenty~~thirty (~~20~~30) days of the receipt of the EPA's comments.
15~~2~~. Remedial Investigation (RI) Report	Draft due within ~~sixty~~ninety (~~60~~90) days after receipt of ~~EPA approval of Final PSC Report~~all validated laboratory data (except supplemental ecological sampling data). Final due within ~~thirty~~sixty (~~30~~60) days of the receipt of the EPA's comments.
16~~3~~. Presentation to the EPA	Within fifteen (15) days after submission of the Final RI Report.
17~~4~~. ~~Remedial Alternatives MemorandumDraft due within thirty (30) days after receipt of EPA approval of Final PSC Report. Final due within fifteen (15) days of the receipt of the EPA's comments. 18. Draft and Interim-Final~~ Draft Feasibility Study (FS) Report	Draft due within ~~forty five~~ sixty (~~45~~60) days after receipt of EPA approval of ~~Final RI Report. Interim-Final due within thirty (30) days of the receipt of the EPA's comments.~~BHHRA Report or BERA Report (whichever is later).
19~~5~~. Final Feasibility Study Report	Due thirty (30) days after receipt of EPA comments following public comment period.

DELIVERABLES/MEETINGS	DUE DATES (CALENDAR DAYS)
~~20~~16. Monthly Progress Reports	Initially due as specified in the RI/FS Work Plan. Thereafter, due by the tenth day of the following month.

APPENDIX B-2

POTENTIAL GUIDANCE DOCUMENTS

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
GULFCO MARINE MAINTENANCE SUPERFUND SITE

The following list, although not comprehensive, comprises many of the regulations and guidance documents that may potentially apply to the RI/FS process:

1. The (revised) National Contingency Plan

2. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, " U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 9355.3-01

3. "Interim Guidance on Potentially Responsible Party Participation in Remedial Investigation and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER Directive No. 9355.3-01.

4. "Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume I" U.S. EPA, Office of Waste Programs Enforcement, July 1, 1991, OSWER Directive No. 9835.31(c).

5. "Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume II" U.S. EPA, Office of Waste Programs Enforcement, July 1, 1991, OSWER Directive No. 9835.1(d).

6. "A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

7. "Guidance for the Data Quality Objectives Process (QA/G-4)," (EPA/600/R-96/055, August 2000).

8. "Guidance for the Data Quality Objectives Process for Hazardous Waste Sites (QA/G-4HW)," (EPA/600/R-00/007, January 2000).

9. "Guidance for the Preparation of Standard Operating Procedures (QA-G-6),"(EPA/240/B-01/004, March 2001).

10. "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001).

11. "EPA Requirements for Quality Assurance Project Plans (QA/R-5)" (EPA/240/B-01/003,March 2001).

12. "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA 600/R-98/018, Febraruy1998).

13. "User's Guide to the EPA Contract Laboratory," U.S. EPA, Sample Management Office, January 1991, OSWER Directive No. 9240.0-01D

14. "CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (draft), OSWER Directive No. 9234.1-01 and -02.

15. "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response,(draft), OSWER Directive No. 9283.1-2.

16. "Draft Guidance on Superfund Decision Documents," U.S. EPA, Office of Emergency and Remedial Response, March 1988, OSWER Directive No. 9355-02.

17. "Risk Assessment Guidance for Superfund - Volume I, Human Health Evaluation Manual (Part A), EPA/540/1-89/002.

18. "Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part B), Development of Risk-Based Preliminary Remediating Goals." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-01B. December 1991.

19. "Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part C), Risk Evaluation of Remedial Alternatives." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-01C. 1991.

20. "Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors." Office of Emergency and Remedial Response. OSWER Directive No. 9235.6-03, March 1991.

21. "Guidance for Data Useability in Risk Assessment." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-09A. April 1992 (and Memorandum from Henry L. Longest dated June 2, 1992).

22. "Supplemental Guidance to RAGS: Calculating the Concentration Term." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-081. May 1992.

23. "Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments," U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997.

24. "Guidance for Data Useability in Risk Assessment," October, 1990, EPA/540/G-90/008

25. "Performance of Risk Assessments in Remedial Investigation/Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs),"August 28, 1990, OSWER Directive No.9835.15.

26. "Supplemental Guidance on Performing Risk Assessments in Remedial Investigation Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)," July2, 1991, OSWER Directive No. 9835.15(a).

27. "Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions," April 22, 1991, OSWER Directive No. 9355.0-30.

28. "Health and Safety Requirements of Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

29. OSHA Regulations in 29 CFR 1910.120 (Federal Register 45654, December19, 1986).

30. "Interim Guidance on Administrative Records for Selection of CERCLA Response Actions," U.S. EPA, Office of Waste Programs Enforcement, March1,1989, OSWER Directive No. 9833.3A.

31. "Community Relations in Superfund: A Handbook," U.S. EPA, Office of Emergency and Remedial

Response, January 1992, OSWER Directive No. 9230.0-3C.

32. "Community Relations During Enforcement Activities And Development of the Administrative Record," U.S. EPA, Office of Waste Programs Enforcement, November 1988, OSWER Directive No. 9836.0-1a.

33. "Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas," TCEQ, December 2001.